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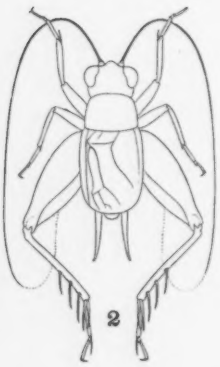

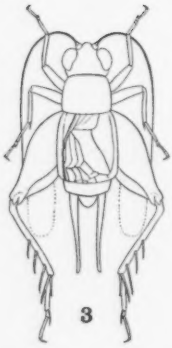

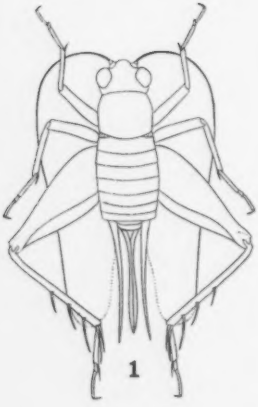

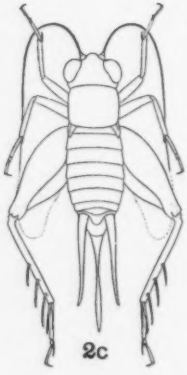

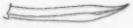

HYGRONEMOBIUS—HEBARD.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXVI. MAY, 1915. NO. 5.

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The Genus Hygronemobius, with the Description of One New Species (Orthop., Gryllidae).

By MORGAN HEBARD, Philadelphia, Pa.

(Plate VI.)

In studying series of South American Gryllidae, we find that the majority of forms of diminutive size and abbreviate tegmina described as members of the genus *Nemobius* belong instead to the present genus.[1] Those of which we have material are treated below; in addition to these we find that *Nemobius basalis* of F. Walker[2] is described as having 3 spines on the dorsal margins of the caudal tibiae and, in consequence, almost certainly belongs to the present genus. *Hygronemobius* has 3 and 3 spines on the dorsal margins of the caudal tibiae, the distal spurs numbering 3 external and 2 internal; *Nemobius* has 4 and 4 spines and 3 pairs of distal spurs. These

1. *Hygronemobius* Hebard, Ent. News, XXIV, p. 451. (1913). [♂ of *H. allens* figured.]
2. Catal. Dermapt. Saltat. Br. Mus., I, p. 58. (1869). [♀, Pará, Brazil.]

features are constant in these genera, but have been almost entirely overlooked in the past. It is, in consequence, impossible for us to place with certainty *Nemobius araucanus*[3] and *nemoralis*[4] of Saussure, though, from the tegminal and other described characters, we believe that examination of the types will prove them to be members of *Hygronemobius*.

KEY TO THE SPECIES OF HYGRONEMOBIUS.

A. Size large (length of body given as 10 mm.)..*basalis* (F. Walker)

AA. Size small, form compact, head and pronotum stout, wings absent.

B. Maxillary palpi dark. General color dark brown, maculate with a still darker shade.

C. Dorso-internal spur of caudal tibia equalling metatarsus in length. Tegmina: ♂, covering 2/3 of abdomen; ♀, minute lateral pads almost entirely concealed by pronotum. Ovipositor with dorsal margin of apex finely serrulate ..... *alleni* (Morse)

CC. Dorso-internal spur of caudal tibia reaching 4/5 of distance to distal extremity of metatarsus. Tegmina: ♂, covering all but apex of abdomen; ♀, very small lateral pads. Ovipositor with apex unarmed.....*liura* new species

BB. Maxillary palpi white, with apex of last joint broadly, and ventral margin of same narrowly, marked with black. General color pale brownish maculate with a darker shade. [Tegmina: ♂, covering 2/3 of abdomen, sharply and transversely truncate; ♀, squamiform, lateral, from Saussure]. Dorso-internal spur of caudal tibia reaching about ¾ of distance to distal extremity of metatarsus.....*dissimilis* (Saussure)

AAA. Size very small, form delicate, head and pronotum proportionately small, wings very elongate. (Maxillary palpi white. Dorso-internal spur of caudal tibia reaching about 2/3 of distance to distal extremity of metatarsus, these members all very delicate. Tegmina: ♂, sharply truncate but broadly rounded; ♀, truncate, with greatest production weakly indicated at sutural margin. Ovipositor with apex unarmed. General coloration sooty, with paler portions brownish; wings whitish when in repose; in general appearance not nearly as maculate as any of the other species.)
albipalpus (Saussure)

Of the four species before us, *alleni* and *liura* appear to be the most nearly related, though showing the widest difference

3. Miss. Sci. Mex., Rech. Zool., VI, p. 388. (1874).
4. Miss. Sci. Mex., Rech. Zool., VI, p. 390. (1874).

in the ovipositor; *dissimilis* shows a general resemblance to these in form, while *albipalpus* is very distinctive in size, form and general coloration, showing, in fact, a decidedly closer general superficial resemblance to one species of South American *Cyrtoxipha* (*guyennensis* Saussure).

When compared with *Nemobius*, the species of the present genus show other differences besides those of the armament of the caudal femora; in the greatly reduced apical area of the male tegmina and the greater divergence of the two axillary veins; in the wholly absent or very greatly reduced tegmina in the females of several species, and in the ovipositor, which in some of the species is wholly unarmed.

But one species, *Hygronemobius alleni*, genotype, is known from within the boundaries of the United States, having been recently found by us in extreme southern Florida.

Hygronemobius alleni (Morse).

1905. *Nemobius alleni* Morse, Psyche, XII, p. 21. [2♂, 2♀, Moraine Cay, Bahamas.]

Nearest in relationship to *H. liura*, the present species may be readily separated, particularly in the female sex, by the characters given in the accompanying key. The original description is excellent but the minute lateral tegmina of the female were unfortunately overlooked.[5]

In addition to that portion of the typical series which has not been destroyed, we have had before us the following series, found on the black soil and among drift in a mangrove swamp near Miami, Florida. At high tide this area was under more than a foot of water. The series was taken when the tide was out, after long and laborious search; at the time the weather was cool and the individuals were not rapid in their movements, but were difficult to capture owing to the environment, their sombre coloration and their habit of hiding under the drift or the sodden mangrove leaves. About the same time, however, a species of *Nemobius* was found in a similar

5. At the time the generic description was written, both adult females of the typical series had been destroyed and it was then supposed that the description of this sex was based on specimens in the instar preceding maturity.

mangrove swamp, where individuals sprang about with astounding rapidity. Several other mangrove swamps about the shores of Biscayne Bay were carefully examined without a trace of the present species being found.

Miami, Florida, March 15 and 16, 1915 (M. Hebard), 1 ♂, 7 ♀, 6 juv. ♂, 4 juv. ♀ [Hebard Cln.].

Hygronemobius liura[6] new species.

TYPE: ♂; Tukeit, British Guiana. July 21, 1911. F. E. Lutz. American Museum of Natural History.

Size small; form compact. Head with interantennal protuberance very feeble, more so than in *H. alleni;* maxillary palpi compact, entirely dark. Pronotum much as in *alleni.* Tegmina reaching base of abdomen, distal margin strongly truncate and very briefly but strongly deflexed, veins very weak, cordes and diagonal vein connected at their extremities by a very weak transverse vein, tambourine absent. Wings absent. Caudal face of cephalic tibiae bearing a large elliptical tympanum, corresponding portion of cephalic face not swollen. Caudal femora as given in generic description; the three spines on each of the dorsal margins are however not literally paired but alternating; distal spurs not as long as in *alleni,* dorso-internal spur (longest of the five distal spurs) reaching only four-fifths of the distance to the distal extremity of the metatarsus (in *alleni* this spur equals the metatarsus in length).

Allotype. Same data as type.

Agrees with the types except in the following sexual features. Tegmina greatly aborted, visible portion almost wholly lateral in position (so much so that the tegmina can scarcely be seen from the dorsal aspect), triangular in outline with angle (disto-lateral in position) broadly rounded. Ovipositor subrect; apex with margins unarmed, dorsal margin very weakly subconcave below line of dorsal margin of shaft, ventral margin very weakly convex from proximal swelling to the very sharp apex.

Coloration. ♂. Very dark brown; very weakly punctate and mottled with a paler and more reddish shade, this mottling more evident on the caudal femora. Tegmina glossy and piceous; intermediate channel cream-buff, this marking continued as a rather broad transverse band margining the tegmina distad, a spot of the same color at the base of the free margin of the dorsal field.

6. From λεῖα smooth and οὐρὰ tail. A substantive alluding to the ovipositor difference between this species and the species of nearest relationship, *alleni.*

♀. Head, pronotum and limbs more decidedly marbled with the paler and more reddish brown. Abdomen dark brown, faintly and very widely punctate with a paler shade. Tegmina very dark brown with a buffy marking filling the brief exposed portion of the dorsal field.

	Measurements (in Millimeters)					
	Length of body	Length of pronotum	Caudal width of pronotum	Length of tegmen	Length of caudal femur	Length of ovipositor
Type, ♂.....	6 3	1.6	1.8	3.1	4.8	....
Allotype, ♀....	6.	1.7	1.8	0.6	4.4	3.6

The series before us, in addition to the type and allotype, may be considered paratypic.

Specimens examined, 5; 3 males and 2 females.

Tukeit, British Guiana, VII, 18 to 21, 1911 (F. E. Lutz), 2 ♂, 2 ♀ [Am. Mus. Nat. Hist.].

Rockstone, British Guiana, VII, 9, 1911 (Crampton and Lutz), 1 ♂ [Am. Mus. Nat. Hist.].

Hygronemobius dissimilis (Saussure).

1874. *Nemobius dissimilis* Saussure, Miss. Sci. Mex., Rech. Zool., VI, p. 387. [♂, ♀, Brazil.]

1901. *Nemobius speculi* McNeill, Proc. Wash. Acad. Sci., III, p. 503. [2 ♂ and 20 immature individuals, Tagus Cove, Albemarle Island, Galapagos Islands.]

McNeill's description and figures leave little room for doubt as to the synonymy of his *N. speculi* with the present species. The two adult males described by him agree in all essential details with those before us. That author gives 3 and 3 spines for the margins of the caudal tibiae and 6 spurs, apparently overlooking the absence of the ventro-internal spur, a characteristic of the present genus. The specimens are given as 5 mm. in length.

When compared with *H. alleni* and *H. liura,* the present species is found to be a smaller insect, agreeing in the robust form and nearly quadrate dorsum of the pronotum. It is much paler in general coloration, but the males before us have the lateral lobes of the pronotum broadly banded with blackish

brown with a few scattered dots of the paler general coloration and the lateral field of the tegmina almost entirely piceous; these markings are simply described as brown by Saussure and McNeill, though the latter refers to the dots in the dark portion of the lateral lobes. In other respects our material agrees fully with Saussure's original description, in which unfortunately the number of spines and spurs of the caudal tibiae are not mentioned, though the length of the dorso-internal spur is given.

MEASUREMENTS (IN MILLIMETERS)

	Tagus Cove, Galapagos Ids. *Type N. speculi* ex McNeill	Petropolis, Brazil.	Brazil. *Types*, ex Saussure	
	♂	♂	♂	♀
Length of body.....	"5.	5.8-6	"6.5	7.5
Length of pronotum.....	....	1.4	1.6	1.6
Caudal width of same.....	....	1.9	2.	2.5
Length of tegmen.....	2.5	2.8-3.	3.	1.
Length of caudal femur....	4."	4.-4.2	4.	4.4
Length of ovipositor.....	....	.....	....	3.2"

Specimens Examined, 2; 2 males.

Petropolis, Rio de Janeiro, Brazil, IV, 12 to 14, 1913 (M. Burr), 2 ♂ [A. N. S. P.].

Hygronemobius albipalpus (Saussure).

1877. *N[emobius] albipalpus* Saussure, Mélang. Orthopt., II, V fasc., p. 257. [♀ Rio de Janeiro, Brazil.]

This distinctive species, previously known only from the type[7], is remarkable in its very small size, graceful form, white maxillary palpi, pronotum which narrows decidedly cephalad, dark sooty markings and very long wings (though, as in the other species of the genus, the tegmina are truncate distad and almost wholly lack the anal field in the male sex). The series

7. The material from French Guiana, recorded by Chopard (Ann. Soc. Ent. France, LXXXI, p. 402, 1912), of which he figures a male, belongs not to this species but to a species of *Nemobius*, probably *trinitatis* of Scudder.

before us shows very little variation in either size or coloration.[8]

MEASUREMENTS (IN MILLIMETERS)

	Bartica, British Guiana		Igarapé Assu, Brazil.		Rio de Janeiro, Brazil. *Type*, ex Saussure
	♂	♀	♂	♀	♀
Length of body	5.3	5.-5.4	5.-5.4	5.3-5.4	"5.
Length of pronotum	1.2	1.-1.2	1.-1.2	1 1-1.2	1.2
Caudal with of same[9]	1.7	1.7-1.8	1.5-1.8	1.5-1.9	2.
Length of tegmen	2.8	2.6-2.8	3.1-3.3	3.1-3 5	3.8
Length of wing	8.3	8.1-9.	8.3-8.3	8.3-8.7	....
Length of caudal femur	3.8	3.8-4.1	3.6-3.8	3.5-4.	3.5
Length of ovipositor	....	2.4-2.8	.....	2.2-2.8	2.2"

Specimens Examined, 26; 8 males and 18 females.

Bartica, British Guiana, December 19 to 24, 1912 (H. S. Parish), 1 ♂, 4 ♀ [A. N. S. P.].

Igarapé Assu, Pará, Brazil, January 17 to 23, 1912 (H. S. Parish), 7 ♂, 14 ♀ [A. N. S. P.].

EXPLANATION OF PLATE VI.

The outlines of the entire insect are 4 times natural size; the others are all greatly enlarged.

1. *Hygronemobius alleni* (Morse). Miami, Florida, Female. Dorsal outline.

1A. Same. Lateral outline of caudal tibia, internal.

1B. Same. Lateral outline of ovipositor.

2. *Hygronemobius liura* new species. *Type*. Male. Dorsal outline.

2A. Same. Lateral outline of caudal tibia, external.

2B. Same. Lateral outline of caudal tibia, internal.

2C. *Hygronemobius liura* new species. *Allotype*. Female. Dorsal outline.

2D. Same. Lateral outline of ovipositor.

3. *Hygronemobius dissimilis* (Saussure). Petropolis, Brazil. Male. Dorsal outline.

3A. Same. Lateral outline of caudal tibia, internal.

4. *Hygronemobius albipalpus* (Saussure). Igarapé Assu, Brazil. Male. Dorsal outline.

4A. Same. Lateral outline of caudal tibia, internal.

4B. *Hygronemobius albipalpus* (Saussure). Igarapé Assu, Brazil. Female. Lateral outline of ovipositor.

8. The number of spines of the dorsal margins of the caudal femora is 3 and 3, absolutely constant in the species of the genus examined, as are 4 and 4 in the species of *Nemobius*. Saussure has given in the original description of this species 3 and 4 of these spines; to have obtained this result he must have counted the dorso-internal spur. These spines in the material here studied are not as nearly opposite as in *Nemobius* and are as a result distinctly alternating.

9. This measurement is necessary but one of the most difficult to judge, owing to the necessity of estimating the points on the curve of the pronotum where the dorsum runs into the lateral lobes.

A new Genus and some new Species Belonging to the Dipterous Family Bombyliidae.

By E. T. Cresson, Jr., Academy of Natural Sciences of Philadelphia.

This paper is the result of a brief study of the genus *Geron* in the collection here. The genus seems to divide into two groups which are quite distinct, holding characters, especially one, which the writer considers of generic value. Typically the species of *Geron* have the third joint of the antennae long and tapering to a fine style-like apex. In 1892 Coquillett described two species which he placed in this genus, which have the third joint broadly rounded or truncated apically. Later he described others with the same character. The style in these, instead of being at the apex is in a shallow notch at or near the upper angle of this joint. It is sometimes so minute as to be scarcely discernible. This character, as well as the absence of scales, and the slight difference in the venation, serves as a base of the following new genus. All the previously known species of the group were described by Mr. Coquillett, and are included in the table of species given in this paper.

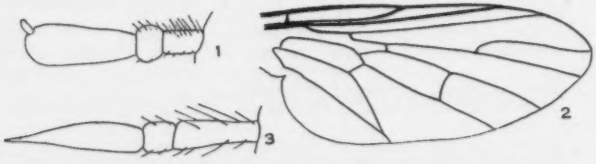

Fig. 1.—Antenna of *Pseudogeron mitis* (x 55). Fig. 2.—Wing of *Pseudogeron mitis* (x 14). Fig. 3.—Antenna of *Geron* sp. (x 55).

Through the kindness of Mr. Knab, of the United States National Museum, the writer was able to examine the typical specimens of most of the described species.

With the aid of these I am able to construct a table of species which I trust will be practical. On account of the lack of good series of many of the species, the amount of variation is difficult to determine and some of the characters used may not

hold. The presence or absence of yellow margins on the abdominal segments is apparently of little specific value and so is not used to the extent that it has been. There is often considerable variation in the length of the proboscis of specimens of the same species, also in the coloration of the halteres, so these characters should be used with care. In associating the two sexes the possible differences in coloration must be considered.

The material examined from Texas and New Mexico was collected by Messrs. J. A. G. Rehn and H. L. Viereck in the late Spring of 1902. All types of the new species, except where otherwise noted, are in the collection here. The length given for the specimens always excludes the proboscis and antennae.

PSEUDOGERON gen. nov.

Small species, moderately pilose to nearly bare. Head hemispherical, at most broad as thorax. Eyes large, broadly contiguous in the male. Frons in female about one-third width of head in known species. Vertical triangle occupied entirely by the prominent ocellar tubercle. Face medianly, contained in the large oral cavity; the sides more or less broad; lower occiput convex. Antennae situated about on median line of eyes; first joint generally shorter than third; second globose; third much longer than broad, apex rounded and notched at or near upper angle in which is situated the short or minute style. Proboscis exserted, corneous, as long as, or longer than, the head; palpi slender.

Thorax higher than long; strongly convex dorsally, more or less hunch-backed. Scutellum convex, rounded apically. Abdomen conical, broad as thorax, rarely longer. Legs slender without spurs; pulvilli normal; empodium rudimentary. Wings hyaline in known species, with auxiliary first and second veins long, the latter ending in the costa; third branched beyond discal cell, the two members of the branch subequal in length, generally acutely diverging at their bases; second submarginal cell about two to four times as long as broad; three posterior cells present; anal cell closed.

Type species—Pseudogeron mitis sp. nov.

TABLE OF SPECIES.

1. Posterior cross vein oblique, more or less sinuate 2
   Posterior cross vein perpendicular to fourth and fifth veins, straight 5
2. First antennal joint nearly four times the length of second; robust, mostly shining species ....**setosa**
   First joint at most twice the length of second; mostly opake species 3
3. Face pilose; small c. v. at or beyond middle of discal cell.
   Abdomen opake .....**trochilus**
   Abdomen shining black, margins of segments yellow .....**cinctura**
   Face bare; small c. v. far before middle of discal cell 4
4. Large (6.0 mm.) robust species .....**capax**
   Small (3.5 mm.) slender species .....**sigma**
5. Males 6
   Females 11
6. Shining black, at most faintly pruinose below .....**atra**
   Mostly cinereous species 7
7. Mesonotum with distinct broad black vittae .....**mitis**
   Mesonotum cinereous, at most narrowly bivittate or faintly marked 8
8. Third antennal joint broadest before its middle and somewhat tapering apically, tibiae mostly yellow .....**fasciola**
   Third antennal joint broadest beyond its middle, not tapering apically, tibiae black 9
9. Mesonotum densely cinereous, narrowly bivittate with black, with faint sublateral presutural spots .....**bivittata**
   Mesonotum at most faintly marked 10
10. Larger (3 mm.), robust, pilose species .....**knabi**
    Small (2 mm.), slender, nearly bare species .....**obscura**
11. First antennal joint, anterior half of frons, humeri and scutellum yellow .....**knabi**
    These parts black, more or less densely cinereous 12
12. Mesonotum distinctly broadly trivittate with brown; orbits of frons and face yellow .....**formosa**
    Mesonotum narrowly bivittate and with large sublateral spots, subopake, black .....**mitis**
    Mesonotum indistinctly marked or narrowly bivittate 13
13. Mesonotum densely cinereous with median pair of narrow vittae and faint sublateral presutural spot (compare *fasciola*) **bivittata**
    Mesonotum not or faintly trivittate 14

14. Fore tibiae entirely black ..... **obscura**
Fore tibiae mostly yellow 15
15. Third antennal joint broadest before middle, tapering apically; larger (3.5 mm.) species ..... **fasciola**
Third joint broadest beyond middle, not tapering; smaller (1.5 mm.) species ..... **marginalis**

Pseudogeron setosa sp. nov.

♂, Black; halteres brown and yellow; hind margins of abdominal segments yellow. Pile long and yellowish.

Shining; abdomen opake. Frons and face silvery, sides of latter on mesal margin thickly beset with long black bristles, also similar bristles on first antennal joint and on posterior orbits.

Robust species. Proboscis twice as long as head; palpi one-fourth as long. First antennal joint nearly as long as third; third as long as first and second, two and one-half times as long as broad with greatest width at middle. Second vein ending opposite middle of second submarginal; latter broad apically due to the forward curving of the last third of the anterior branch of third vein, so that the length of the cell is hardly twice as long as its greatest width. Small c. v. beyond middle of discal cell; post c. v. oblique and straight.

♀, Destitute of the black bristles on the head, halteres entirely yellow; second submarginal cell longer and the post. c. v. sinuate. Length, ♂, ♀, 5.0 mm.

Holotype—♂, Tahoe, California, August 11, 1905. Type No. 6080.

Allotype—♀, Topotypic.

These specimens have been in alcohol and the pile is matted. Normally, there may be considerable amount of pruinose coating present which is not apparent on the type specimens.

In venation this species is similar to the typical *Geron* but there is no attenuation in the third antennal joint.

Pseudogeron capax.

1892. *Geron capax* Coquillett, Can. Ent., xxiv, 126.

Described from specimens of both sexes from Orange County,* California.

I have examined a male (cotype) and a female from Los Angeles County, California; a male labeled "Cala" and another male bearing label "39." I have not seen the specimens that are responsible for the New Jersey record.

* Orange County is a part of the original Los Angeles County.

Pseudogeron sigma.

1902. *Geron sigma* Coquillett, Proc. U. S. Nat. Mus., xxv, 101, 1903.

Described from both sexes from Alabama, North Carolina and California.

I have examined a female (cotype) from North Carolina and two males from Colorado. That these are conspecific, I will only assume.

Pseudogeron cinctura.

1894. *Geron cinctura* Coquillett, Tr. Am. Ent. Soc., xxi, 111.

Described from both sexes from Southern California.

I have not seen this species. The description suggests *P. setosa,* but the markings of the thorax separate this species, unless perfect specimens of that species show similar markings. Then the length of the antennae may be of value.

Pseudogeron trochilus.

1894. *Geron trochilus* Coquillett, Tr. Am. Ent. Soc. xxi, 111.

Described from both sexes from Southern California.

I have examined 2 ♂ and 1 ♀ from Alamogordo, New Mexico; 1 ♀, El Paso, Texas, April.

Pseudogeron atra sp. nov.

♂, Black, shining; knob of halteres yellow. Sparsely pilose. Proboscis as long as head; palpi more than half as long. First and second antennal joints subequal in length; third one and one-half times as long as broad with greatest width beyond middle. Second vein ending beyond middle of second submarginal; latter four times as long as broad; small c. v. just beyond basal c. v. and far before middle of discal cell; post. c. v. straight. Length, 1.6 mm.

Holotype—♂, Alamogordo, New Mexico, May 7, 1902. Type No. 6081.

Pseudogeron obscura sp. nov.

♂, ♀, Similar to *P. formosa,* but head and legs entirely black. Mesonotal markings similar but much subdued or absent. Yellow margins of abdominal segments very narrow, almost wanting. Second submarginal cell three times as long as broad. Length, 1.6-2 mm.

Holotype—♀, Alamogordo, New Mexico, April 9, 1902. Type No. 6082.

Allotype—♂, El Paso, Texas, March 31, 1902.

Before me is a female from Highrolls, New Mexico, June 3, 1902, which is probably this species, but its condition is not good enough for critical study.

Pseudogeron formosa sp. nov.

♀, Black, frontal and facial orbits, palpi, halteres, hind margins of dorsal abdominal segments and entire venter, trochanters, bases and apices of fore and middle femora and tibiae, and basal veins of wings, yellow. Opake: head and thorax densely cinereous, frons and face with broad black median stripe; occiput brownish medianly. Mesonotum with a broad and two narrow median brown stripes. Scutellum with a median brown spot. Dorsal abdominal segments opake velvety black with hind margins yellow. Legs more or less cinereous.

Bare or nearly so. Proboscis as long as head and thorax together; palpi very short. First and second antennal joints subequal; third, one and one-half times as long as first and second, three times as long as broad, with greater width beyond middle. Second vein ending beyond middle of second submarginal; latter at least four times as long as broad. Small c. v. near base of discal, opposite basal c. v.; post. c. v. straight. Length, 2 mm.

Holotype—♀, Alamogordo, New Mexico, June 26, 1902. Type No. 6083.

Paratype—1 ♀, topotypic.

Pseudogeron mitis sp. nov. Figs. 1, 2.

♂, Black; halteres brown and yellow; hind margins of abdominal segments yellow; basal veins of wings pale.

Opake, mesonotum and scutellum more or less shining. Frons, face and lower occiput densely cinereous. Mesonotum with two well-separated median stripes and broad lateral margins and pleurae densely cinereous, scutellum with cinereous margin. Abdomen densely cinereous with bases of segments more or less opake to subopake, black. Legs sparsely cinereous. All pile white.

Pilose. First antennal joint nearly twice as long as second; third, one and one-half times as long as first and second, three times as long as broad, with greatest width near apex. Proboscis as long as head; palpi half as long. Second vein ending opposite middle of second submarginal; latter three times as long as broad; small c. v. before middle of discal cell and beyond basal c. v.; post. c. v. straight.

♀. Head entirely cinereous. Palpi slightly shorter. Thorax cinereous; mesonotum with two fine median stripes anteriorly and large spot laterally interrupted at suture, another small supraalar spot, all subopake black. Scutellum immaculate. Legs more densly coated. Second submarginal cell slightly longer. Length, ♂, ♀, 3.0-3.8 mm.

Holotype—♂, Alamogordo, New Mexico, May 7, 1902. Type No. 6084.

Allotype—♀, topotypic, April 20, 1902.

Paratypes—7 ♀, topotypic, April 23 to May 1, 1902.

Pseudogeron bivittata sp. nov.

♂, Black; halteres, margins of dorsal and ventral abdominal segments, knees and basal veins of wings yellow. Entirely opake, densely cinereous, sparingly white pilose which is more abundant on abdomen. Frons and face silvery; mesonotum with a median pair of narrow brown stripes, abbreviated posteriorly.

Proboscis as long as thorax; palpi one-fourth as long. First and second antennal joints subequal; third, twice as long as first and second, three times as long as broad, with greatest width at middle. Second vein ending slightly before middle of submarginal; small c. v. before middle of discal cell and far beyond basal c. v.; post. c. v. straight.

♀, Proboscis shorter and palpi longer in proportion. Third antennal joint shorter. Length, ♂, ♀, 3.0-3.5 mm.

Holotype—♂, El Paso, Texas, April 5, 1902. Type No. 6085.

Allotype—♀, topotypic.

Pseudogeron knabi sp. nov.

♂, Black; base of palpi, halteres, margins of abdominal segments, knees, basal veins of wings, costa as far as end of auxiliary and entire first vein yellow. Moderately white pilose, pile long on head and abdomen. Densely cinereous; frons and face silvery; mesonotum blackish, with faint darker sublateral presutural spots.

Face bare above. Proboscis twice as long as head; palpi slightly more than one-fourth as long. First antennal joint hardly longer than second; third three times as long as first, two and one-half times as long as broad with its greatest width at or beyond middle. Second vein at middle of second submarginal; latter two and one-half times as long as broad; small c. v. before middle of discal cell and beyond basal c. v.; post. c. v. straight.

♀, Anterior half of frons, face, first antennal joint, base of palpi, prothorax, humeri, lateral mesonotal margins more or less, scutellum, abdomen except bases of segments, apices of femora and all tibiae yellow; halteres white. Proboscis longer in male. Length, ♂, ♀, 3.0 mm.

Holotype—♂, Las Cruces, New Mexico, October 5, 1895 (T. D. A. Cockerell), [U. S. N. M. Type No. 19222.]

Allotype—♀, topotypic.

Although the two sexes are so different in their coloration, there are characters which determine their association. Such are the venation, yellow bases of palpi and the form of the antennae, as well as the similarity of the data regarding their habitat.

Pseudogeron marginalis sp. nov.

♀, Similar to *P. formosa* but the head entirely black; mesonotal markings obsolete or faintly discernible. The second submarginal cell three times as long as broad. Legs entirely, or all femora, fore and middle tibiae entirely, and bases of their tarsi, bases of hind tibiae, yellow. Length, 1.3-2.0 mm.

Holotype—♀, Alamogordo, New Mexico, May 2, 1902. Type No. 6086.

Paratypes—4 ♀, topotypic, April 26 to May 1, 1902.

Pseudogeron fasciola.

1892. *Geron fasciola* Coquillett, Can. Ent., xxiv, 125.

Described from both sexes from Merced County, California.

I have examined cotypes of both sexes. The species approaches the preceding but differs in the structure of the antennae. This is the only species I have seen in which the third antennal joint is at all tapering from the base to apex. The decided notch and truncate apex decide its generic position.

Data Wanted on the Screw Worm Fly (Dip.).

In connection with the investigations which the Bureau of Entomology is conducting relating to the screw-worm fly, *Chrysomyia macellaria*, the undersigned desires to secure records of the first appearance in spring of adults of this species in various parts of the United States.—F. C. BISHOPP, Box 208, Dallas, Texas.

The Cotton Worm Moth in Minnesota (Lep.).

Apropos of the note in the NEWS for April, page 185, the cotton worm moth, *Alabama argillacea*, was present here in the latitude of St. Paul in large numbers, last autumn, and caused a little damage and much anxiety to growers of late-bearing strawberries, because the moths actually attacked the fruit itself, inserting their proboscids into the pulp, and in the estimation of the growers, seriously injuring the berries. This is the first occurrence, to the best of my knowledge, in the last thirteen years, of this moth being found in this latitude in Minnesota.—F. L. WASHBURN, State Entomologist.

On the External Anatomy of Adelphocoris rapidus Say, with Reference to the Taxonomy of the Miridae or Capsidae (Hemip.).[1]

By H. M. PARSHLEY, Bussey Institution, Harvard University.

(Plate VII.)

During the preparation of this brief discussion of Mirid anatomy, I had occasion to consult the writings of various students of the Hemiptera, and I am, in consequence, able to present evidence which seems to settle definitely the much disputed question regarding the correct name for the family under consideration. Kirkaldy in 1902 adopted the name Miridæ in place of the universally used Capsidæ in accordance with the principle that the family name should be derived from that of the oldest included genus.[2] Others, however, believe that the rule of priority should obtain in determining the family designation, the first name in Latin form thus being the one which should be accepted. Among those who hold this view is Horvath, who in 1911 published a paper[3] in which he attempted to fix the proper names for the several families of Hemiptera. This article[4] furnishes information of value, but some of the names adopted are not consistent with the main principle of the paper. As it happens, it is not necessary to look into the respective merits of these two views in deciding upon the correct name for the family. *Miris* is certainly the oldest genus in the family, and should be the basis for the family name if the oldest genus is to be regarded as the type. On the other hand, the oldest name to be given to the family was *Mirides*,[5] proposed by Hahn[6] in 1831. This term was used in a systematic table in a book with German text, and it is therefore a true Latin form, of which *Miriden* would be the vernacular equivalent.

[1] Contributions from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 87.

[2] *Miris* Fab., 1794; *Capsus* Fab., 1803.

[3] Ann. Mus. Nat. Hung., ix, 1911, p. 1.

[4] Reviewed by Van Duzee, Ent. News, xxii, 1911, p. 431.

[5] Overlooked by Horváth, l. c.

[6] Wanz. Ins., i, 1831, p. 234.

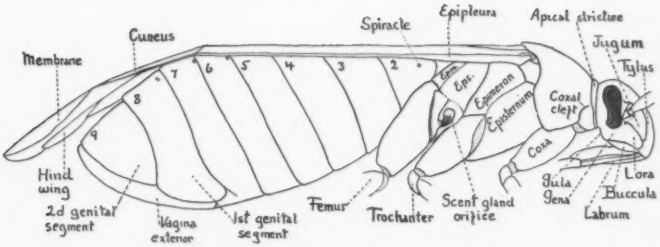

Fig.1. Lateral view of Adelphocoris rapidus ♀.

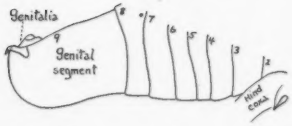

Fig.2. Abdomen of A.rapidus ♂, right side

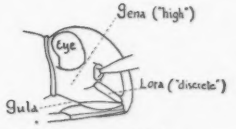

Fig.9. Diagram of head.

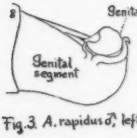

Fig.3. A. rapidus ♂, left side

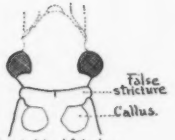

Fig.6 Miris dolobratus.

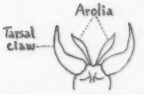

fig.10. A.rapidus

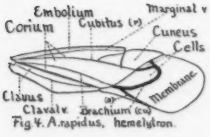

Fig.4. A.rapidus, hemelytron.

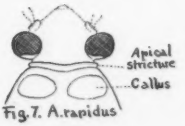

Fig.7. A.rapidus

Fig.11. Monalocoris filicis

Fig.5. A. rapidus. hind wing.

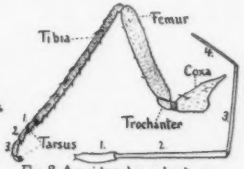

Fig.8. A.rapidus, leg and antenna.

Fig.12. Lopidea media

Thus it is by no means a vulgar name as suggested by Van Duzee.[7] To conform with modern usage the termination must be changed to *-idae,* but this cannot affect the nomenclatorial standing of the term. Similarly subfamily and tribal names must now end in *-inae* and *-ini* respectively, but no one thinks of ignoring the subfamilies and tribes of Stål and Reuter because these authors used the terminations *-ina* and *-aria* in naming those groups.[8] Reuter, Bergroth, and others[9] have adopted the name Miridae, and we may well follow them since their view seems to be supported by the evidence, from whichever standpoint it may be viewed.

As a basis for this review of the external characters of the Miridae, I have used a common and widely distributed species, introducing such comparative material as I have found available. Most of the technical terms will be found equally applicable in the other families of Heteroptera. Earlier treatments of the subject may be found in the writings of the authors cited, especially in the works of Reuter,[10] which are fundamental for the study of this family.

The Head. (Plate vii, fig. 1.)

The term **tylus** (*clypeus*) may well be applied, as in other families of Heteroptera, to the anterior median portion of the head.[11] The triangular pieces on each side of the tylus may for the same reason be called the **juga** (the *Jochstücke* of Reuter). The **lorae** (*Kopfzügel, maxillary laminae*[12]) lie just inferior to the juga, from which they are set off by an impressed line. Below and posteriorly they may be fused with the genae (*lorae confluent*), as in fig. 1; or they may be marked off by a fine line (*lorae discrete*), as in fig. 9. The **genae** (*Wangen*) are largely occupied above by the eyes. Be-

[7] Can. Ent., xlvi, 1914, p. 386.

[8] A parallel case in the nomenclature of the Formicidae has been brought to my attention by Dr. W. M. Wheeler.

[9] Van Duzee (*in litt.*) now accepts this view.

[10] See especially Acta Soc. Sci. Fenn., xxxvii, No. 3, 1910, p. 84 (Phyl. u. Syst. Mir.)

[11] For a discussion of the true morphological nature of these parts see Muir and Kershaw, Psyche, xviii, 1911, p. 1.

[12] See Tower, Ann. Ent. Soc. Am., vi, 1913, p. 427. Anatomy of the Squash Bug.

low the eyes their vertical width is generally slight, as in fig. 1 (*genae low*), but sometimes (*e. g.* in certain Restheniini), their width is great and may be equal to the vertical diameter of the eyes, as in fig. 9 (*genae high.*). The **bucculae** (*Wangenplatten*) are thin ridge-like plates partially enclosing the base of the four-segmented **rostrum** or beak. The **gula** (*Kehle*) is the posterior median part of the head below. As this part varies greatly in extent and position in different species, it furnishes valuable taxonomic characters. In the Miridae the **antennae,** fig. 8, always consist of four segments, but otherwise, by their great diversity in form, vestiture, and proportions, they present important and easily observable criteria.

The Prothorax.

The anterior margin of the prothorax in certain groups is provided with an **apical stricture**, a complete collar-like annulus set off by an impressed line, figs. 1, 7, 9. In other groups, for instance in the tribe Mirini, the apical stricture is lacking, although sometimes a false and incomplete stricture is formed by the anterior margins of the calli and the humeral impressed lines, as in *Miris,* fig. 6. The **coxal cleft,** fig. 1, also produces at times the impression of a stricture when viewed laterally. In all cases the presence or absence of a true apical stricture should be carefully noted, as this character is of major importance in classification. The **calli** are two more or less raised areas situated anteriorly on the pronotum, figs. 6, 7. The prosternal **xyphus** is a part of the prosternum appearing as a triangular plate between the anterior coxae. In *Adelphocoris* it is limited in front by the apical stricture and is concave with raised margins, while in other groups it may be convex or even conical and without raised margins, thus affording important taxonomic characters.

The Mesothorax. (Plate vii, fig. 1.)

The pleural region is very clearly divided by an oblique line into two parts, furnishing one of the distinctive characters of the Miridae, these structures, when present, being much less clearly defined in other families. The larger and antero-in-

ferior part is the **episternum,** the smaller and postero-superior the **epimeron.**[13] The dividing line is not a true suture, but results from an infolding of the integument for muscle-attachment. It appears significant that the high development of these structures is correlated with the characteristic activity of these insects, which run about with great rapidity and take wing almost as readily as flies. In the Miridae and certain closely related families the **sternum** is composite, the parts being separated by a median longitudinal suture and confluent on the sides with the episterna.

The Metathorax. (Plate vii, fig. 1.)

The pleural region is divided as in the preceding segment but here the epimeron is relatively smaller. The **orifices** of the scent glands lie between the middle and hind coxae. They are of very variable form in this family and may be reduced or absent in certain groups. The sternum is composite.

The Abdomen.

The abdomen in the Miridae consists of ten segments, all of which can be seen only in a dorsal view. The **spiracles,** fig. 1, are located laterally, near the dorsal edge of the ventral segments, except the first pair which is on the tergum. The **genital segments** are very different in the sexes, figs. 1, 2, 3, the male being asymmetrical. Good specific characters will doubtless be afforded by the genitalia, but these structures are yet to be investigated in detail.

The Arolia.

The parts of the legs, fig. 8, afford a number of characters, all of which are easily observable, except the **arolia,** which require some discussion, being very important taxonomically though somewhat obscure. In *Adelphocoris,* fig. 10, the arolia are to be seen as two elongated membranous structures attached to the end of the last tarsal joint between the claws. They are approximated basally and divergent apically. In *Lopidea,*

[13] This use of these terms corresponds with that common in other orders but hardly agrees with Reuter's statement (l. c. p. 90), where some error, possibly typographical, seems evident.

fig. 12, they are distant basally and convergent apically. In *Monalocoris*, fig. 11, they are distant basally, but diverge widely so that they remain close to the claws throughout their length. In the subfamily Bryocorinae, to which this genus belongs, the arolia are sometimes adherent to the claws for the greater part of their length, and in certain groups they may be entirely absent. These facts may be generalized, giving the following types of arolia:

1. Divergent, approximated at base, fig. 10.
2. Divergent, distant at base, fig. 11.
3. Convergent or parallel, distant at base, fig. 12.

The Wings.

The **hemelytron**, fig. 4, consists of the **clavus, corium, embolim,**[14] **cuneus** and **membrane,** the distinctness of which parts constitutes one of the characters of the family Miridae.[15] The veins of the hemelytra, according to the opinion of Bergroth,[16] should be named morphologically as indicated in parentheses in fig. 4. However, there is some doubt in my mind whether or not this application of the Comstock-Needham terminology is wholly correct, and comparative studies in the Heteroptera are needed to establish fully the homologies involved. Purely systematic terms are not available for all the veins, as only two have received names. Thomson[17] called the outer vein of the corium **cubitus** and the inner **brachium,** and Reuter employs these names because of established usage, though he questions the correctness of the term cubitus.[18] According to the latter author, the brachium, on emerging into the membrane, forms the outer boundaries of the two **cells,** the dividing line between the cells being an extension of the cubitus. The vein of the clavus may be called the **claval** and that near the anterior margin of the wing the **marginal.** The inner longitudinal vein of the membrane has not been used

[14] Not distinct in *Adelphocoris,* but clearly marked off in other groups, *e. g. Hyaliodes* Reut.
[15] And Anthocoridae.
[16] Ann. Soc. Ent. Belg., lvi, 1912, p. 148, footnote.
[17] Opuscula Entomologica, fasc. iv, 1871, p. 411.
[18] Festschrift f. Palmén, No. 1, 1905, Hem. Spec. I, p. 31.

taxonomically, and, in fact, appears to have been overlooked by Reuter and previous authors as noted by Bergroth (l. c.), who calls it an **anal** vein. Sometimes the membrane is one-celled, and in certain Restheniini several longitudinal veins may be present.

The veins of the metathoracic wing were named by Fieber[19] as shown in fig. 5. Reuter uses the same names, substituting the word *"vena"* for **costa** in each case. In certain groups a short and incomplete vein, the **hamus**, projects backward into the cell from the costa subtensa. This structure is considered by Reuter to be of importance in tracing phylogenetic relationships, its presence indicating a relatively primitive condition. It is absent in *Adelphocoris*, which belongs to the Capsini, a highly specialized tribe of the subfamily Mirinae, but in the figure I have indicated its position as it occurs in *Plagiognathus*, which belongs to the Phylinae, a more primitive group.

Conclusion.

The main anatomical features on which is based the classification of the Miridae may be summarized as follows: The form and structure of the arolia; the presence or absence of the apical stricture of the pronotum; the structure of the lorae; the presence or absence of a wing-hamus; the venation of the membrane, and the extent of the genae. Among the many other characters of lesser import, used in defining the lower groups, may be mentioned the structure of the xyphus; the form and proportions of the antennal segments; the shape of the head, prothorax, and parts of the hemelytra; and the position of the hind coxae. These characters were discovered by various authors, but the determination of their relative importance and their employment in a coherent and comprehensive system are in great measure the work of Reuter. Color and markings are for the most part very variable within specific limits, and this, together with the fact that certain structures also exhibit intra-specific variability, indicates that there is in this family an opportunity for work on incipient species and varieties which will be of general biological interest.

[19] Eu. Hem. 1861, p. 13.

Observations on the Preoviposition, Oviposition and Incubation Periods of Dermacentor nitens in Panama (Arach., Acar.).*

By L. H. DUNN, Board of Health Laboratory, Ancon, Canal Zone.

In January, 1913, Dr. Darling[1] detected in Panama a horse infected with *Piroplasma caballi.* This was the first record of this piroplasma in the New World, and in view of its probable transmission by the tropical horse tick, *D. nitens,* the following observations were made concerning the bionomics of this tick in Panama.

According to Hooker,[2] *D. nitens* passes both molts on the host. Upon the hatching of the larval or seed ticks they attach themselves to a suitable host, and, after engorging themselves with blood, molt without becoming detached from the host. After molting they appear in the nymphal stage and again become engorged with blood and molt for the second time without separation from the host. After the second molt the ticks are in the adult stage and the females after copulation and becoming engorged with blood drop to the ground to deposit their eggs. This makes three blood meals taken from the same host between the larval and adult stages.

This species nearly always adopts horses and mules as hosts —but are sometimes found on other animals—and the ears seem to be the special place of attachment, although they may frequently be found on other parts of the body—as on a horse's neck under the mane—but in such cases they are generally single individuals and not in colonies as they occur in the ears.

A number of *Dermacentor nitens* was collected from a small stray mule found wandering about in Guachapali District. Judging from its condition the mule had evidently been straying about in the "Bush" for some time before coming into Panama, as it was in very poor condition, having several large festering sores on various parts of its body and was also

*Read before The Medical Association of the Isthmian Canal Zone, January 16, 1915.

[1]Jour. Inf. Dis. XIII, No. 2, Sep. 1913, Chicago.

[2]Jour. Econ. Entom., 1908, I, p. 47.

heavily infested with ticks. The inner side of both ears* was a thick mass of attached *Dermacentor nitens* in all stages of development—from small larvae to engorged adult females—but the majority consisted of nymphs. Of the number taken from the ears twelve engorged and partially engorged females was separately weighed and measured and placed in separate petri-dishes numbered consecutively from 1 to 12.

The state of engorgement of each tick was noted, as owing to the mule's condition it was condemned and killed, making it impossible to secure a sufficient number of females that were fully engorged, but of the twelve selected eight were fully engorged and would undoubtedly have very soon detached themselves if they had been left on the ear and the mule not been killed.

The ticks were observed and noted as being:

Tick No. 1—Fully engorged.
Tick No. 2—Fully engorged.
Tick No. 3—Partly engorged.
Tick No. 4—Fully engorged.
Tick No. 5—Fully engorged.
Tick No. 6—Fully engorged.
Tick No. 7—Nearly engorged.
Tick No. 8—Fully engorged.
Tick No. 9—Fully engorged.
Tick No. 10—Partly engorged.
Tick No. 11—Partly engorged.
Tick No. 12—Partly engorged.

The weights and measurements of the twelve females varied. The largest one, being fully engorged, weighed .2199 gram, and was 11 mm. in length, 8 mm. in width, and 5 mm. in height. The smallest being but partially engorged, weighed .0607 gram, was 7 mm. in length, 5 mm. in width, and 3 mm. in height. The combined weight of the twelve ticks was 1.2963 grams.

The weight and measurement of each tick was noted as follows:

	Weight	Length	Width	Height
Tick No. 1..	.2199 gram	11 mm.	8 mm.	5 mm.
" 2..	.1421 "	10 "	6 "	4 "
" 3..	.0458 "	8 "	5 "	3 "
" 4..	.1592 "	10 "	6 "	4 "
" 5..	.1467 "	10 "	7 "	4 "
" 6..	.1297 "	8 "	6 "	4 "
" 7..	.0757 "	8 "	5 "	3 "
" 8..	.0994 "	9 "	6 "	4 "
" 9..	.0832 "	8 "	6 "	4 "
" 10..	.0660 "	8 "	5 "	3 "
" 11..	.0679 "	9 "	5 "	3 "
" 12..	.0607 "	7 "	5 "	3 "

*Note.—The ears contained so many ticks and were such good specimens to show a severe infestation of *D. nitens* that upon the death of the mule one of the ears was removed and preserved and has now been sent to the Panama-Pacific Exposition at San Francisco.

The petri-dishes containing the ticks were kept on a slightly darkened shelf out of all direct sunlight.

The period of preoviposition was fairly short. The number of days elapsing from the time that the ticks were detached from the ear to the time that depositing of eggs began is given below:

Tick No. .	1	2	3	4	5	6	7	8	9	10	11	12
Days	6	5	7	6	6	5	6	6	5	6	7	6

When oviposition began an actual count was made each morning of eggs deposited during the preceding twenty-four hours, by means of a hand lens and a blunt needle to separate the eggs. When counted they were then placed in a second petri-dish having a number corresponding with the number of the dish containing the parent tick. The daily removal of the eggs from the dish containing the tick to a separate dish avoided mistakes of counting the same eggs twice, and numbering the dishes prevented eggs of one tick being mistaken for those of another.

The largest number of eggs deposited by one tick in twenty-four hours was 434, and the smallest number was but 1. The largest number deposited by one tick during the entire period of oviposition was 2401, and the smallest number was 194. The total number of eggs deposited by all the ticks was 12,269.

The eggs deposited by Tick No. 3 were nearly all in bad shape at the time they were deposited, having the appearance of being shriveled and dried up. Some of the eggs of No. 5 were also in bad shape at time of deposition.

Twenty-five eggs were weighed within twelve hours of the time they were deposited and the results showed the average weight of each egg to be .000064 gram. As the total number of eggs deposited was 12,269 this gives the total weight of all eggs deposited to be .785216 gram.

The longest oviposition period of any of the twelve ticks was sixteen days, the shortest was eight days. The following table shows the number of eggs deposited daily by each tick:

June	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
Tick No. 1..	....	154	434	395	326	301	240	202	119	91	60	33	19	13	14	....	....	= 2401
" 2..	70	256	300	309	139	92	62	31	18	10	14	4	2	5	....	....	....	= 1312
" 3..	....	....	12	65	31	13	17	15	8	6	2	18	3	4	...	....	.	= 194
" 4..	....	373	410	290	214	145	86	71	22	28	10	3	7	2	1	....	4	= 1666
" 5..	....	335	341	211	153	116	79	21	16	38	26	5	....	1	....	....	....	= 1342
" 6..	9	378	322	213	158	123	43	36	39	7	8	1	....	....	....	....	....	= 1337
" 7..	....	190	159	98	60	43	25	19	10	6	6	2	....	....	....	....	.. .	= 618
" 8..	....	291	253	156	152	49	72	23	14	10	5	2	2	2	....	....	....	= 1031
" 9..	14	301	187	110	178	55	29	10	13	6	8	4	2	1	....	....	....	= 918
" 10..	....	63	154	101	57	34	35	13	9	11	4	3	3	....	....	....	....	= 487
" 11..	....	....	162	112	54	27	22	15	1	8	....	....	....	....	....	....	....	= 401
" 12..	....	167	154	66	60	46	23	24	15	....	7	....	....	....	....	....	....	= 562
																		12,269

When oviposition was completed the petri-dishes were sealed with vaseline and placed in a fairly light part of the room but out of all direct sunlight.

The minimum and maximum daily temperatures were recorded. The lowest temperature at any time during the entire period of incubation was 71 degrees F., the highest was 94 degrees F. The average minimum temperature during the incubation was 74 degrees F., and the average highest was 89 degrees F.

The shortest incubation period was twenty-five days, counting from the time the first eggs of that batch was deposited until the first larvae emerged from the same lot of eggs.

The incubation period of eggs from each tick is shown:

Tick No. .	1	2	3	4	5	6	7	8	9	10	11	12
Days	27	27	27	25	27	27	26	26	26	25	25	25

After a number of larvae had emerged, it was impossible to keep accurate record of their emergence on account of young larvae, empty egg shells, and unhatched eggs all being massed together so closely that when they had apparently all emerged there may have been a few remaining eggs with unemerged larvae to escape notice, but as nearly as could be ascertained it required about five days for all the larvae to leave the eggs after emergence began.

The eggs had been placed in the centers of the dishes before sealing with vaseline and nearly all of the young larvae swarmed on the sides and under surface of the covers of the dishes

within a short time after they emerged and were easily removed.

After the larvae were removed from the dishes, the unhatched eggs were separated from the empty egg shells and the few larvae that had failed to swarm and remained in the egg heap by means of the hand lens and needle used in counting, and by making a count of the unhatched eggs the percentage of emergence was obtained.

The percentage of emergence of larvae from eggs of each tick is as follows:

Tick No.	1	2	3	4	5	6	7	8	9	10	11	12
Percentage emerged.	99	89	58	94	11	78	91	87	76	85	59	73

The average emergence was 75 per cent. The percentage of eggs from which larvae failed to emerge was high, but it must be taken into consideration that all the eggs were more or less handled during counting and undoubtedly many that did not hatch were spoiled by being bruised or punctured by the needle used in counting.

The foregoing observations were carried out in June, one of the months of the rainy season in Panama. The Monthly Meteorological Report of the Panama Canal gives the following conditions for the month of June at Ancon and is given here for its comparative value in case similar observations should be made during the dry season:

Mean Wet Ther. (deg. Fah.)	Mean Dew Point (deg. Fah.)	Mean Relative Humidity (per cent)	Mean Vapor Pressure (inches)	Evaporation Total (inches)
76	75	89	.862	3.280

Rainy Days	Clear Days	Partly Cloudy Days	Cloudy Days
21	1	11	18

Remarks.

The accommodation of the tick to environment may be noted in the case of Nos. 3, 7, 10, 11 and 12. None of these was fully engorged. Under normal conditions they would have

remained on the host longer or until completely engorged. However, when taken from the host before complete engorgement, they showed no difference in the length of the preoviposition period but deposited their eggs on an average as early as those that were completely engorged when detached, but it is to be noted that they deposited a smaller number of eggs.

Another peculiar feature noted was the difference in the length of incubation period between the eggs deposited at the beginning of oviposition and those last deposited. Take for instance Tick No. 1 which began ovipositing on June 8th and continued until June 21st, covering a period of fourteen days. The eggs began hatching on July 5th and presumably they were all hatched by July 10th. If the eggs first deposited are the first to hatch they would cover an incubation period of twenty-seven days, while if the last deposited eggs were the last to hatch their period would be nineteen days, making a difference of eight days between the eggs first deposited and those of the last of oviposition. From this it appears that eggs first deposited require a longer period of incubation than those deposited later. I hope at a later date to be able to make more extended observations on this feature of the period of incubation.

Fragments on North American Insects—IX.

By A. A. GIRAULT, Washington, D. C.

Nematus ribesii in Virginia (Hym.).

As noted above, larvae in various stages of development were to be found at Blacksburg on currants and gooseberries on May 13, 1902. From some of those kept indoors, adults were obtained on May 26, after about twelve days in the cocoon.

Nematus ventralis (Hym.).

Some larvae obtained from willow in the same locality June 28, 1902, cocooned on the following day and emerged between July 23 and 31, after from twenty-four to thirty-two days.

Callirhytis glandulosus in Virginia (Hym.).

Professor William B. Alwood was kind enough to bring to me from Cumberland Court House, Virginia, some branches of scrub oak on which were some very remarkable galls. They were within the acorns (July 30, 1901) and Professor Alwood told me that when he was examining them when on the trees, the small cases containing the larva

would grow out, so to speak, of the acorn and drop to the ground, "growing out" by means of fleshy stalks which would extend themselves and push the larval cases out. The dropping of the cases "made a continual patter," resembling that of rain on the foliage of trees in a forest. Upon examining the acorns, the teethlike larval cases were found to be arranged in a row at the base of the kernel of the acorn where they fitted into cavities; each one was upon a fleshy stalk; an acorn may contain from 4 to 6 of them. They are double, the inner case being pea-shaped and holding the larva. The larvae continued alive up to October 2, but died during the winter. The identification was through the kindness of Dr. L. O. Howard.

Callirhytis seminator (Harris) in Maryland and Virginia (Hym.).

By June 7, 1901, pupae were present in the galls of this species at Annapolis, emergence following about one week later. On June 16, the same year at Blacksburg, Virginia, adults were emerging, continuing up to July 3.

Syneches thyridopterygis (Riley) (Hym.).

This parasite was reared from the overwintered bags of *Thyridopteryx ephemeraeformis* Haworth at Annapolis, Maryland, June, 1901. The identification was by Ashmead.

Laelius trogodermatis Ashmead (Hym.).

In the original description of this species no mention is made of the carinae on the metathorax of which, in this species, there are 9, the five mesial ones complete, the two in the dorso-lateral aspect abbreviated caudad, not running quite half the length of the segment. The scutellar impression is crescentic. These notes from a single female identified by Ashmead.

The Trichogrammatid Genus Ophioneurus (Hym.).

For probable description of development of this genus, see Ganin, Zeitschr. f. Wiss. Zool., XIX, pp. 381-451.

Metamymar aleurodis Riley MS. and Pteratomus putnami Packard (Hym.).

The former mymarid has been overlooked. I do not know what it is nor whether it is described in the following reference: Fourth Rep. U. S. Ent. Commission, p. 107, note 29a. It is probably a *nomen nudum*. For figure of the rare *Pteratomus* see Amer. Naturalist, 1878, XII, pp. 445-448.

Polynema bifasciatipenne (Girault) (Hym.).

I find a reference under morphology of Mymaridae to Ayers on *Teleas* in Memoirs Boston Society of Natural History, III, 1884, pp. 261 ff. After *Teleas*, for some reason I had written "(= *Polynema bifasciatipenne?*)" Also I noted Ayers' references to Filippi and a marginal note referred to Packard's and Balfour's embryologies.

A Supposed Mymarid Parasite of Tabanid Eggs (Hym., Dip.)

From a mass of tabanid eggs obtained from the margin of a stream at Butler, Illinois, July, 1910, a mymarid near *Alaptus* issued but the specimen was lost. A number of *Phanarus tabanivorus* Ashmead also issued from the same mass. The mymarid probably came from the eggs.

Records of Parasites and Predators of Spider Eggs (Hym., Dip., Aran.).

I had collected the following references, which should be brought together, though not complete: *Acoloides emertonii* Howard (Bull. 45, U. S. Nat. Mus., pp. 171-172; Insect Life, II, p. 202); *Acoloides saitidis* Howard on *Saitis pulex* (Insect Life, IV, p. 124), on *Phydippus morsitans* (Proc. Ent. Soc. Washington, II, p. 300); *Acolus zabriskiei* Ashmead (Bull. 45, U. S. Nat. Mus., p. 175); *Aradophagus fasciatus* Ashm. on *Pityophthora querciperda* Swz. and *Brachyrhynchus granulatus* Say (De Dalla Torre, Cat. Hymenop., V, p. 512); *Baeus americana* Howard on Epeirids (Insect Life, II, pp. 270-271; Proc. Ent. Soc. Washington, II, p. 299); *Eupelmus piceus* Riley on *Argiope argentata* (Proc. Ent. Soc. Washington, II, 1892, p. 297); *Pimpla* spp. predaceous upon *Epeira angulata* and *Argiope riparia* (Proc. Ent. Soc. Washington, II, p. 294 et al.); *Pimpla inquisitor* on *Argiope riparia* (Insect Life, I, p. 324); *Pezomachus obesus* Brues from egg capsules of a spider (Bull. Wisc. Nat. Hist. Soc., VIII, p. 72); *Aphiochaeta epeirae* Brues on *Epeira* sp. (? eggs) (Aldrich, Cat. N. A. Diptera, 1905, p. 336); Cyrtidae on spiders (? eggs) (ib., p. 219); *Sarcophaga piceus* on *Argiope argentata* and *Phydippus opifex* (Insect Life, IV, p. 269). See also this journal, VII, 1896, p. 320; Proc. Ent. Soc. Washington, V, p. 308 and Insect Life, VI, pp. 259-260.

Insects Eaten by the Yellow-billed Cuckoo (Hem., Dip., Lep.).

A stomach of one of these birds killed on May 31, 1902, was roughly examined by Professor E. A. Smythe (Blacksburg, Virginia), who gave me the contents as follows (sex and age of bird not noted): 1 intact adult *Tibicen septendecim*, a partly digested adult tipulid and a finely divided mass of hairy caterpillars, probably those of *Malacosoma americana*.

The Birdbug Attacking Human Beings (Hem.).

Although it is known that the close allies of the common bedbug (*Cimex lectularius* Linnaeus) will feed upon human blood in confinement (it has been proved for *C. columbarius*), cases are certainly rarely made known where the parasites naturally attack human beings. The following extract from a letter received from Prof. Glenn W. Herrick in September, 1910, is unique, or if not so, still of great interest and impor-

tance. Professor Herrick wrote: "I am in receipt of two very interesting letters from a woman in Oriskany, New York, who is much worried regarding what she thinks are bedbugs. However, I have finally obtained specimens from her, and they are much smaller than the ordinary bedbug. Since the chimney in the house is full of swifts, and these bugs apparently invaded the room from an opening in the chimney, I take it for granted that they are a species parasitic upon the swift. Even if this be true, her letter is interesting from the fact that she maintains that these bugs have attacked voraciously the occupant of the bed in the room next to the chimney. She says, 'There is no doubt, I think, of their having bitten my sister not only two nights, but fresh bites having appeared during the second day, we examined her clothing and found them (the bugs) hidden there.' So far as I am aware, this is a new role for this particular bug."

Specimens which I received from Professor Herrick were most probably *Cimex hirundinis*, but I could not compare them with actual specimens of that species. The evidence is not complete, but the facts incline me to believe it more and more probable that the allies of *lectularius* will readily forsake their original or natural hosts when these latter are near to dwellings and attack human beings. A fowlhouse or a pigeon loft may thus become a center of infestation and the possibilities of disease transmission from animal to man so much augmented.

Tibicen septendecim (Linnaeus) in Montgomery County, Virginia (Hem.).

On June 21, 1901, and later, English sparrows were observed catching the adults of this species above a half dozen times, once or twice when the cicada was flying. I noticed the characteristic egg-slits in the following trees: White cedar (*Chamaecyparis sphracroidea;* trees apparently not injured); Wild cherry (*Prunus* sp.; small slits); European linden (*Tilia europaea;* wounds large and ruptured); White oak (*Quercus alba;* injury very noticeable); Red oak (*Quercus rufa;* injury noticeable); Apple (*Pyrus malus* vars.); Dogwood (*Cornus*); Hickory (*Carya* sp.); Black walnut (*Juglans nigra*); Lilac (*Syringa? vulgaris*); Persimmon (*Diospyros virginiana*); Peach (*Prunus persica*); Poplar (*Populus* sp.); Sycamore (*Platanus occidentalis;* small, subtriangular punctures); an unknown tree in forest of mountains;

Red cedar (*Juniperus virginiana;* no injury); Quince (*Pyrus cydonia;* not bad); Beech (*Fagus* sp.); native plum (*Prunus? umbellata;* not bad); Hawthorn (*Crataegus? flava*); Chestnut (*Castanea americana* var.; slight); Box Huckleberry (*Gaylussacia;* 3 bushes out of 35 examined); Acacia (*Robinia pseudacacia*); Hawthorn (*Crataegus? parvifolia*); Mountain Laurel (*Kalmia latifolia*); Willow (*Salix*); Blackberry (*Rubus villosus* etc.; on second year growth); Alder (? *Alnus* sp.); Raspberry (*Rubus strigosus* var.; on second year stems; also *R. occidentalis* var.); Blueberry (*Vaccinium virgatum;* old wood); Crab apple (*Pyrus baccata* var.); Maple (*Acer dasycarpum; A. saccharinum*); Birch (? *Betula* sp.); Sycamore maple (*Acer? pseudoplatanus*); Ash (*Fraxinus* sp.; large wounds) and Dewberry (*Rubus trivialis*).

Trees with herbaceous stems or with thick sap seem to be avoided by the mother cicada, as in the case of certain maples and the pines and spruces.

Additional Notes on Anasa tristis De Geer (Hem.).

At Blacksburg, Virginia, July 31, 1901, some squashes in a garden at the Virginia Experiment Station were found to be badly infested with this insect. The eggmasses contained from four to thirty eggs, but occasionally an isolated egg was found; they were on either surface of the leaf, usually the lower surface. In two masses which had hatched all the exit-holes were in the same end of both the eggs and the mass. On August 6 an adult locustid was observed eating the eggs of the bug; three eggs were eaten in succession. This fact had been formerly suspected. When first hatched the antennae, head and thorax are red, changing after two hours to black.

Duration of the Pupal Stage of Adalia 15-punctata (Col.).

A full grown larva of this species obtained from an apple tree at Blacksburg, Virginia, June 25, 1901, and fed in confinement upon aphids, attached itself to a leaf by the end of its abdomen at about 2 p. m., June 28, pupated about 8 a. m., June 30, and emerged as an adult about eight o'clock July 4 following. When disturbed, the pupa erected itself violently, no doubt a reaction against parasitism.

Leptinotarsa 10-lineata (Say) (Col.).

I noticed a pair of these beetles apparently mating on August 19, 1901, at Annapolis, Maryland; larvae were then numerous on potatoes.

A Predaceous Enemy of Macrodactylus subspinosus (Col.).

At Blacksburg, Virginia, June 27, 1901, I observed an adult Asilid with an adult of this beetle impaled on its beak. On June 16, *subspinosus* was noted as having been very injurious to some cultivated cherries; the foliage was simply riddled with small irregular holes, while the fruit was badly eaten into, leaving little islands of the outer surface standing here and there over the circumference.

Wandering Larvae of Pyrrharctia isabella (Lep.).

On October 31, 1901, at Blacksburg, Virginia, the larvae of this species were common, wandering about over the ground as is their habit before winter arrives; one was observed as late as December 7, while on December 28, 1901, at Annapolis, Maryland, again a few were observed. On the 18th of January, 1902, at Blacksburg, a hibernating larva was found while in April 6 following, in the same locality, a full-grown larva was found. In the Maryland locality, wandering was observed as early as September 13 (1901).

Carpocapsa pomonella Linnaeus (Lep.).

The adults of this species were emerging at Annapolis, Maryland, in 1901, about May 11, from overwintered pupae.

Harrisina americana, the American Procris (Lep.).

A colony of the larvae of this species obtained from a correspondent in Virginia by Professor William B. Alwood pupated at Blacksburg on July 22 (average), the moths emerging on August 3 following. The larvae were on cultivated grape. At Annapolis, Maryland, the same year, a colony about half grown were taken from grape on September 3 (1901).

The Method of "Worming" for the Peach Borer Sanninoidea exitiosa Say (Lep.).

While engaged in studying this insect for the national Bureau of Entomology in Georgia in 1906, I observed a variety of methods in practice for the purpose of removing the larvae from the trees, but they all seemed to me to be doing more harm than necessary to the trees, at the same time not proving very efficient. I remember distinctly following several different gangs engaged in the operation and obtaining from the treated trees nearly as many of the caterpillars as would be obtained from a like number of untreated trees at the same place. Many of the trees, moreover, had been badly wounded without, it appeared, the compensating destruction of the larvae. Whether the Bureau has a note to the effect or not I am uncertain, so that while thinking of it take this opportunity of recording my mental impression of the correct procedure without, I hope, seeming to infringe upon the rights of the Department of Agriculture. By trial, I have repeatedly satisfied myself that locating the larva and removing it is a comparatively simple matter and one to be learned easily from experience by any close observer and that it would be economical for large orchardists to employ one unusually bright workman for this purpose alone throughout the whole year rather than as is done now to have gangs of a half dozen or more stupid ones, employed irregularly and when working chiefly occupied in half-girdling the trees and killing earthworms. To locate a larva but one cut of the knife is necessary and this cut should also kill it. The correct method is rapid, sure and

safe, and until we know to the contrary the only practice worth while in connection with this insect. A good, strong jack-knife is the only tool required, several inches of the surrounding soil having been removed previously.

Another Note on Hyphantria cunea Drury (Lep.).

On July 4, 1901, at Blacksburg, Virginia, I obtained a large nest of this species from Pear, the larvae averaging about 5 mm. in length. They were fed in confinement and pupated on August 2. They were not observed further. On August 19, at Annapolis, Maryland, the larvae were abundant in various stages of growth and a month later it was noted that all had pupated for the winter. They were very abundant in that part of Maryland in 1901. On August 29 a note was made to the effect that the caterpillars were very annoying in the town of Annapolis, crawling over houses, on to people and so on. Larvae were still in numbers September 13.

Dryocampa rubicunda (Lep.).

July 5, 1901, I obtained some of the caterpillars of this moth from a sugar maple on the campus of the Virginia Polytechnic Institute at Blacksburg, Virginia. The tree was badly infested by them. Ten of the larvae were confined and fed, entering the earth for pupation on July 5 (average) and emerging on July 28 to 30. The few eggs obtained were yellow, flattened, globular from above, glabrous, with a diameter of about 1.25 mm.

A Butterfly Which is Confined to Isolated Areas of Small Size (Lep.).

Some years ago in Virginia I used to accompany Mr. Hermann J. Erb, of New York City, on some of his collecting trips into the mountains of southwest Virginia. One of the most interesting of these (to me then) and most fascinating of adventures into wonderland was a trip to a little valley at the base of what is called Roanoke Mountain near Blacksburg. Here there seemed to be a "metropolis" for that beautiful and interesting species of butterfly, *Papilio ajax*. In this little depression they could be found in large numbers at certain times of the year (mid July for one), while in the surrounding country, only an occasional individual would be encountered, probably a stray from the colony. I made no note tending toward an explanation.

Collecting Moths of the Noctuid Genus Catocala (Lep.).

During a number of trips with the same collector some of the most interesting were in pursuit of those splendid bark-mimicking moths of the genus *Catocola*. Armed with stout sticks, an unfrequented mountain forest was usually entered and separating, the collectors went from tree to tree, scraping their sticks lightly up and down the trunks. This effectually frightened any moths resting upon the bark and when this happened, the specimen was watched until it alighted again, upon

which a wide-mouthed cyanide bottle was placed over it. The sticks were moved gently along the trunks so as not to hit the moths. In frequented forests, where cattle ran for instance, these moths appeared to be absent or else scarce, due no doubt to their being continually disturbed. Occasionally some specimen, when flushed, would alight far up, so that it would have to be climbed for. Mid-day is the best time to collect, since the higher the sun climbs the lower the moths descend on the tree trunks. Oaks and hickories were what might be called the favorite trees. This was in July.

Protoparce celeus and carolina (Lep.).

While in a tobacco field near Annapolis, Maryland, August 30, 1901, I noticed that both of these species were present in large numbers, and in all stages of development. Of a large number of eggs found the majority were on the under surface of the leaves, but from one portion of the field as many as twenty-six eggs were noticed upon the upper surface. On September 19, in the same field, larvae in all stages were still present in seed fields, but no eggs could be found.

Desmia maculalis Westwood (Lep.).

This species was found abundant at West Annapolis, Maryland, September 3, 1901, on cultivated grape. Sometimes two or three of the caterpillars were found on one leaf. By September 12 all the caterpillars kept in confinement had pupated, but no adults emerged subsequently.

Empretia stimulea Clem. (Lep.).

The local papers at Annapolis, Maryland, in August, 1901, printed one or two sensational articles concerning this insect, which was reported to be annoyingly abundant and causing many cases of blood poisoning. At the time I happened to find a larva on rose in a garden, but could find no others and have never seen them at all abundant. Their armature, however, can sting very severely. At Mossman, North Queensland, some months ago, I accidentally pressed my finger on a very similar larva (evidently of the same family) and received a severe shock. No ill effects, however, followed. The pain caused is severe and sudden. I have seen the larvae of *stimulea* on plum at Washington, D. C. Its sting is quite as severe as that of the tropical insect.

Larva of Heliothis obsoleta Fabricius Eats a Larva of Empretia (Lep.).

On September 10, 1901, I obtained at Annapolis, Maryland, a full-grown caterpillar of *Heliothis obsoleta* from the ear of a corn plant. It was kept temporarily in one of those light wooden boxes used for safety-matches of Swedish manufacture. On the morning of the twentieth I saw that the larva had escaped through a hole cut through the top of the box and after some searching I gave it up for lost. However, upon opening a nearby box of white pine, covered on two

sides with gauze and in which was being kept a larva of *Empretia stimulea,* I was surprised to find the *obsoleta* larva within, engaged in feeding upon the *Empretia,* its head buried into the back of the latter. It was removed and placed under a beaker on a sheet of white paper. After trying to escape for some time, it finally successfully pupated. The *Heliothis* larva had not been fed since its time of capture and was thus driven to its meal of flesh by hunger.

Hemerocampa leucostigma Smith and Abbott in Maryland (Lep.).

The shade trees along the streets of Annapolis were badly infested by this insect in 1901 (August and September). Cocooning of the larvae of the last generation commenced about August 30, continuing for about ten days. (On September 22 larvae were still crawling about). The cocoons were conspicuous in many places on houses and buildings, the under side of clapboards and window sills, along rain spouts, the under sides of ledges and so on being lined with them. The State House along the lower stories was full. The under surface of leaves, loose bark and other places on trees also afforded shelter for many. The wandering full-grown larvae caused some annoyance. By September 8 several females had emerged and on the 16th a male was noticed. On September 22 a female was observed resting upon her recently deposited eggmass and on the following day it was noted that they were present in numbers and eggmasses were becoming more abundant. On September 25, at Blacksburg, Virginia, it was noted that the male moths were plentiful at lights.

Philampelus achemon Drury (Lep.).

A full-grown larva of this species taken from grape at Annapolis, Maryland, September 7, 1901, pupated in confinement, the pupa passing the winter.

Icthyura palla French in Maryland (Lep.).

On the seventeenth of September, 1901, I found on a willow at West Annapolis, Maryland, a number of bunches of leaves fastened together by silken threads and also lined with a mat of silk, each bunch forming a nest which contained the caterpillars of this species in various stages of growth. In one nest seventeen larvae were found, ranging from 1.25 to 2.5 cm. On September 22 a few of the larvae pupated in confinement. Six days later at Blacksburg, Virginia, full-grown larvae were observed and also on October 6; younger stages were also present. On October 14, larvae in confinement were again pupating while out-of-doors; most of the nests appeared to be deserted, though some larvae were observed feeding openly on foliage; yet most of them had crawled to the ground and formed their cocoons. This was done since September 22, gradually as each stage came to full growth. In Virginia larvae of this species have been observed feeding upon white oak.

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., MAY, 1915.

The International Entomological Congress.

It may be remembered that the third meeting of the International Entomological Congress is scheduled to be held in Vienna, Austria, from the 5th to the 12th of September of the present year. Even if the European war should come to an end before that time it would probably not be expedient under the circumstances to hold the meeting. So far as we are aware the Executive Committee of the congress has not taken any action in relation to postponement. The entomologists of the Western Hemisphere are more vitally concerned regarding the time and place of meeting, as they must travel a long distance, at considerable expense, and make preparation in advance. The entomologists in Europe, being so much nearer the place of meeting, do not have the same difficulties. It is not an easy problem to decide on the best mode of action. The Executive Committee could postpone the meeting indefinitely and then be guided by circumstances in deciding when and where it should be held, or it might be advisable to be more specific and decide to hold the meeting in a town like Geneva or Lucerne, in Switzerland, in 1916. The members of the Executive Committee should consult the interests of entomology solely in this matter and all national, racial and linguistic considerations be relegated to the background. The Pacific Coast meeting of the American Association for the Advancement of Science and also that of the Entomological Society of America, coincident with the Panama Pacific Exposition this summer, will probably take all our entomologists to California, and no one from this side of the Atlantic would be likely to go to Vienna, even if the war should terminate suddenly. The first two meetings of the congress were very successful and it is to be hoped that the third meeting may also be a success and that it may be managed in such a way that the war will not interfere—H. S.

The Executive Committee of the International Congress of Entomology considers it advisable to postpone the Third Congress, which was to be held at Vienna this year. It is to be hoped that the deplorable state of affairs in Europe will have no serious ill effect on the future international relations between entomologists. A Congress held under the present circumstances might tend to separate rather than to unite. This information was received after the above was written. —H. S.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of systematic papers are all grouped at the end of each Order of which they treat, and are separated from the rest by a dash.

Unless mentioned in the title, the number of new species or forms are given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London.

For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

1—Proceedings of the Academy of Natural Sciences of Philadelphia. **3**—The American Naturalist. **4**—The Canadian Entomologist. **5**—Psyche. **7**—Bureau of Entomology, U. S. Department of Agriculture, Washington. **8**—The Entomologist's Monthly Magazine, London. **11**—Annals and Magazine of Natural History, London. **13**—Comptes Rendus, Societe de Biologie, Paris. **18**—Ottawa Naturalist. **21**—The Entomologist's Record, London. **36**—Transactions, Entomological Society of London. **37**—Le Naturaliste Canadien, Quebec. **40**—Societas Entomologica, Zurich. **45**—Deutsche Entomologische Zeitschrift. **50**—Proceedings, U. S. National Museum. **66**—Die Naturwissenschaften, Berlin. **67**—Entomologiske Tidskrift, Stockholm. **68**—Science, New York. **81**—Biologisches Centralblatt, Erlangen. **84**—Entomologische Rundschau. **97**—Zeitschrift fur wissenschaftliche Zoologie, Leipzig. **102**—Proceedings of the Entomological Society of Washington. **107**—Revista, Museu Paulista, Saõ Paulo, Brazil. **123**—Bulletin of the Wisconsin Natural History Society, Milwaukee. **153**—Bulletin of the American Museum of Natural History, New York. **161**—Proceedings, Biological Society of Washington. **166**—Internationale Entomologische Zeitschrift, Guben. **177**—Quarterly Journal of Microscopical Science, London. **179**—Journal of Economic Entomology. **207**—Anales, Academia de Ciencias Medicas, Fisicas y Naturales de la Habana, Revista Cientifica. **216**—Entomologische Zeitschrift, Frankfurt a. Main. **223**—Broteria, Revista de Sciencias Naturaes do Collegio de S. Fiel. (Ser. Zoologica). **242**—Transactions, Royal Society of Canada, 3d Series, Ottawa. **322**—Journal of Morphology, Philadelphia. **344**—U. S. Department of Agriculture, Washington, D. C. **361**—Atti della Societa Italiana di Scienze Naturali e del Museo Civico di Storia Naturale in Milano, Pavia. **411**—Bulletin, Brooklyn Entomological Society. **420**—Insecutor Inscitiae Menstruus: A monthly journal of entomology, Washington.

447—Journal of Agricultural Research, Washington. 456—Kosmos, Handweiser fur Naturfreunde, Stuttgart. 502—American Museum of Natural History, New York. 503—Boletin, Sociedad Physis, Buenos Aires.

GENERAL SUBJECT. **Bethune, C. J. S.**—Bibliography of Canadian Entomology for the year 1913, **242,** viii, 53-68. **Britton, W. E.**—The academic training of the entomologists in colleges and experiment stations of the U. S., **179,** viii, 72-8. **Chapman & Glaser**—A preliminary list of insects which have wilt, with a comparative study of their polyhedra, **179,** viii, 140-49. **Cockerell, T. D. A.**—Miocene fossil insects [Orthop., 1; Hemipt., 1; Hymen., 8; Dipt., 9], **1,** 1914, 634-48. **Davis, J. J.**—Cages and methods of studying underground insects, **179,** viii, 135-39. **Elkner, R.**—Seltsame gaste, **166,** viii, 186. **Escherich, K.**—Amerika als erzieher in der angewandten entomologie, **456,** 1915, 78-82. **Fernald, H. T.**—Some present needs in economic entomology, **179,** viii, 30-40. **Howard, L. O.**—On possible poisoning of insectivorous birds in the war against the gipsy moth, **102,** xvii, 2. Notes on the progress of economic entomology, **179,** viii, 113-18. **Letourneau, F.**—Insectes bienfaiteurs, **37,** xli, 113-15. **Lutz, F. E.**—How to collect and preserve insects, **502,** Guide Leaf. Ser. 39. **Natzmer, G. V.**—Das biogenetische grundgesetz im leben der Insektenstaaten, **81,** xxxv, 30-6. **Quade, F.**—Insektenstiche, Resultat der rundfrage, **216,** xxviii, 115-16 (cont.). **Schmidt, K. W.**—Schnee und Eis, doch fruhlingsahnen in der Natur, **216,** xxviii, 117. **Webster, F. M.**—Importance of observations on apparently unimportant insects, **4,** 1915, 69-73. **Weiss, H. B.**—The symmetry of insects, **4,** 1915, 88-90.

PHYSIOLOGY AND EMBRYOLOGY. **Dederer, P. H.**—Oogenesis in Philosamia cynthia, **322,** xxvi, 1-42. **Morgan, T. H.**—The infertility of rudimentary winged females of Drosophila ampelophila, **3,** xlix, 240-50.

ARACHNIDA, ETC. **Borelli, A.**—Gli Scorpioni del Museo Civico di Storia Naturale di Milano, **361,** liii, 456-64. **Tragardt, I.**—On the new gen. Ceratoacarus, Ewing, **67,** xxxv, 186-7.

NEUROPTERA, ETC. **Hood, J. D.**—An outline of the subfamilies and higher groups of the insect order Thysanoptera, **161,** xxviii, 53-60. **Muttkowski, R. A.**—Description of a Trichopterous larva from the Pribilof Islands, Alaska, **123,** xiii, 42-5. **Snyder, T. E.**—Biology of the termites of the eastern U. S., with preventive and remedial measures, **7,** Bul. No. 94, 13-85. **Stehli, G.**—Die ungezieferfrage im felde, **456,** 1915, 104-108.

Banks, N.—New Neuropteroid insects, native and exotic [19 new], **1,** 1914, 608-32. **Lloyd, J. T.**—Wood-boring Trichoptera [1

new sp.], **5,** xxii, 17-21. **Longinos-Navas, S. J.**—Neuropteros Sudamericanos (Ser. 2), **223,** xiii, 5-13.

ORTHOPTERA. Nininger, H. H.—Note on the mouth parts of O., **5,** xxii, 13-16. **Turner, C. L.**—Breeding habits of Ceuthophilus latens, the camel cricket, **123,** xiii, 32-41.

Cockerell, T. D. A. (see under General).

HEMIPTERA. Cockerell & Robinson—Description and records of Coccidae [1 new], **153,** xxxiv, 105-113. **Gillette & Bragg**—Notes on some Colorado Aphids having alternate food habits, **179,** viii, 97-103. **de la Torre Bueno, J. R.**—Note on the Harris collection of Heteroptera, **5,** xxii, 16-17. **Turner & Baker**—On the occurrence of an intermediate in Aphis pomi, **102,** xvii, 42-51. **Woodworth, C. W.**—The rate of hatch of scale insect eggs, **4,** 1915, 98-9.

Ainslie, G. G.—A new aphid from Florida, **4,** 1915, 85-8. **Cockerell, T. D. A.** (see under General). **Green, E. E.**—Some remarks on the coccid genus Leucaspis, with descriptions of two n. sps., **36,** 1914, 459-68. **Parshley, H. M.**—Hemiptera-Heteroptera of Maine, Corrections, etc., **5,** xxii, 22-3. **Sasscer, E. R.**—Catalogue of recently described Coccidae—V. **102,** xvii, 25-38.

LEPIDOPTERA. Baumann, C.—Asymmetrische flugelausbildung bei schmetterlingen, **40,** xxx, 15. **Bethune-Baker, G. T.**—"Notes on the taxonomic value of the genital armature in L."; A reply; What are the tegumen and valve in the armature of the L.? **21,** 1915, 10-13; 31-5. **Burrows, C. R. N.**—Notes on the taxonomic value of the genital armature in L., **21,** 1915, 40-3. **Fassl, A. H.**—Die vertikale verbreitung der L. in der Columbischen West Cordillere, **84,** xxxii, 9-10. **Gerould, J. H.**—The cotton worm moth in 1912, **68,** xli, 464-5. **Heinrich & De Gryse**—On Acrocerops stregifinitella, **102,** xvii, 6-23. **Pierce, F. N.**—"Notes on the taxonomic value of the genital armature in L.," **21,** 1915, 7-10.

Dyar, H. G.—New American L. [8 new], **420,** ii, 161-4. **Gibson, A.**—Fauna Ottawaensis. Family Noctuidae: Phytometrinae, **18,** 1915, 151-55. **von Ihering, R.**—A tracas que vivem sobre a preguica, **107,** ix, 123-7. **Jones, E. D.**—New sps. of L. Heterocera from S. E. Brazil, **36,** 1914, 437-56. **Pearsall, R. F.**—Short studies in Geometridae, No. 4, Supplemental note, **411,** x, 24. **Strand, E.**—Ueber einige exotische Syntomiden des Deutschen Entomologischen Museums, **45,** 1915, 19-29. **Walsingham, L.**—Lepidoptera Heterocera IV, 393-424. Biologia Centrali Americana. Zoology.

DIPTERA. Back & Pemberton—Life history of the Mediterranean fruit fly from the standpoint of parasite introduction, **447,** iii, 363-74. **Bishopp, Dove & Parman**—Notes on certain points of

economic importance in the biology of the house-fly, **179,** viii, 54-71. **Britton, W. E.**—The prevalence of Macrosargus cuparius in the U. S., **5,** xxii, 29-31. **Cockerell, T. D. A.**—Diptera from the Seychelles (Notes on curious modifications in Drosophila), **3,** xlix, 251-2. **Gahan, A. B.**—Notes on two parasitic D., **102,** xvii, 24-5. **Greene, C. T.**—Capture of Callicera johnsoni, **102,** xvii, 1. **Hewitt, C. G.**—Notes on the pupation of the house-fly (Musca domestica) and its mode of overwintering, **4,** 1915, 73-8. Observations on the feeding habits of the stable-fly (Stomoxys calcitrans), **242,** viii, 37-42. **Knab, F.**—Dipterological miscellany, **102,** xvii, 38-40. **Murillo, R. G.**—Hipodermosis bovina, **207,** li, 75-80. **Rudow, Dr.**—Die schmarotzer der fliegen, **216,** xxviii, 118 (cont.). **Tavares, J. S.**—A Anastrepha serpentina nova praga dos frutos no Brazil, **223,** xiii, 52-4. **Thompson, W. R.**—Sur un diptere parasite de la larve d'un mycethophilide, **13,** lxxviii, 87-9. **Townsend, C. H. T.**—Note on the Spallanzaniine flies (Abstract); The family Oestrophasiidae and other notes (Abstract), **102,** xvii, 41; 53-4.

Aldrich, J. M.—A new Sarcophaga parasitic on Allorhina nitida, **179,** viii, 151-2. **Cockerell, T. D. A.** (see under General). **Felt, E. P.**—Mycodiplosis macgregori n. sp., **179,** viii, 149. **Johnson, C. W.**—Two new sps. of Borboridae, **5,** xxii, 21-2. **Knab, F.**—Drosophilidae with parasitic larvae (from Hawaii); A new Cuterebra from Panama, **420,** ii, 165-69; 187-8. New data and species in Simuliidae [1 new], **420,** ii, 177-80. **Malloch, J. R.**—Four new North American D., **161,** xxviii, 45-48. **Townsend, C. H. T.**—Phyllophilopsis, new name for Phyllophila, **4,** 1915, 78.

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HYMENOPTERA. Buttel-Reepen, H.—Haben die bienen einen farben und formensinn? **66,** iii, 80-82. **Keilin & Thompson**—Sur le cycle evolutif des Dryinidae, Hymenopteres parasites des Hemipteres, **13,** lxxviii, 83-7. **Morice & Durant**—The authorship and first publication of the "Jurinean" genera of H.: Being a reprint of a long-lost work by Panzer, with translation into English . . ., **36,** 1914, 339-436. **Sladen, F. W. L.**—Inquiline bumble-bees in British Columbia, **4,** 1915, 84.

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KEY TO THE FAMILIES OF NORTH AMERICAN INSECTS. An Introduction to the Classification of Insects. By CHARLES T. BRUES, Assistant Professor of Economic Entomology, Harvard University, and A. L. MELANDER, Professor of Entomology, State College of Washington. Boston, Mass., and Pullman, Wash. Published by the Authors, 1915. Pp. vii, 140. 18 plates of line figures. $1.50 postpaid.

"The present manual attempts to bring together a brief yet complete key to the families of American insects, unhampered by more than the explanations needed to make such a tabulation available to the general student....Identification of the families has been effected by means of analytical keys, which have been arranged as dichotomies .....While the dichotomies frequently represent the natural relationships or the lines of phyletic development, no attempt has been made to preserve natural divisions wherever the convenience and practical operations of the keys would have been sacrificed..... The task of the writers has been little more than to compile from [the] existing

literature the most recent ideas, and they have gleaned from...many sources in various languages." (Preface).

Perhaps the first thing to strike the reader on looking over this volume is that for the first time, we believe, in an American text-book, the newer classifications are employed. Thus "the unified ordinal groups essentially as limited by Handlirsch" are adopted, and the "Conspectus of the Higher Groups of Insects" on page 1 begins with "Class Pterygogenea, Subclass Orthopteroidea" under which, as orders, are the Grylloblattoidea, Orthoptera [*i. e.* Saltatoria only], Phasmoidea, Diploglossata, Dermaptera and Thysanoptera. Then follows the Subclass Blattaeformia and so on. The Hymenoptera are divided into the Chalastogastra and Clistogastra, the primary subdivisions of the latter being the Ichneumoniformia, Vespiformia, Spheciformia and Anthophila. In the Coleoptera the results of the labors of Lameere, Ganglbauer, Kolbe and Gahan are seen in the recognition of the two suborders, Adephaga and Polyphaga, with fifteen groupings of the families of the latter. The subclass Panorpoidea embraces the orders Panorpatae, Trichoptera, Lepidoptera, Diptera and Suctoria. Curiously enough, the Thysanura, Campodeoidea, Collembola and Mirientomata (each of which, as with Handlirsch, ranks as a class, hence coequal to the Pterygogenea) are at the end of the Conspectus, after all the highly specialized groups.

The key to the 37 Orders occupies pp. 6-12. The keys to the families fill pp. 13-83. There are 427 outline figures on the 18 plates which give one an idea of the appearance of the representatives of many families or of parts of the body used in classification. Those on Plate 17 are of immature stages, those on Plate 18 of terrestrial Arthropods not insects. The figures are chiefly redrawings by Mrs. Brues.

There is a Glossary of Special Terms, pp. 121-127, and an Index to Genera and Higher Groups, pp. 128-140.

Whether we use the newer classifications or not (and the reviewer has been employing many of them in his University classes), a valuable feature of this book is that it will introduce them to many American students to whom they seem to be more or less unknown. P. P. C. (*Advertisement*).

HANDBOOK OF MEDICAL ENTOMOLOGY. WM. A. RILEY, PH.D., Professor of Insect Morphology and Parasitology, Cornell University, and O. A. JOHANNSEN, Ph.D., Professor of Biology, Cornell University. Ithaca, New York. The Comstock Publishing Company, 1915. Pp. ix, 348. 174 figs. Postpaid $2.20.

This "Handbook of Medical Entomology is the outgrowth of a course of lectures along the lines of insect transmission and dissemination of diseases of man given by the senior author in the Department

of Entomology of Cornell University during the past six years. More specifically it is an illustrated revision and elaboration of his 'Notes on the Relation of Insects to Disease,' published January, 1912." It is an excellent summary of present information on the subject, viewed from the human side.

The book is not, of course, limited to the insects, as one might infer from the first paragraph of the Preface just quoted, but includes the Arachnida, Myriopoda and, in one instance at least, the Crustacea also. In the titles of the chapters, "Arthropods" is the group name most frequently employed. After a brief Introduction (I) on the "Early suggestions regarding the transmission of disease by insects" and "The ways in which Arthropods may affect the health of man," there are chapters on Arthropods which are directly poisonous (II), Parasitic Arthropods affecting man (III), Accidental or Facultative Parasites (IV), Arthropods as simple carriers of disease (V), as Direct inoculators of disease germs (VI), as Essential hosts of pathogenic organisms (VII), as Essential hosts of pathogenic Protozoa (3 chapters, VIII-X), and on Some possible but imperfectly known cases of Arthropod transmission of disease (XI). The treatment of the subject is, therefore, ecological rather than entomological, and the title of the book seems to us misleading, as a "Handbook of Medical Entomology" leads one to expect primarily a consideration of the Arthropods producing certain effects than of the effects due to Arthropods. While the order followed may be useful in a purely didactic course of lectures, we do not find it well adapted to a laboratory course of instruction.

The effects of mosquitoes are considered in four different places, under chapters II, III, VII and VIII, those of ticks in chapters II, III, IX and X. Any one who wishes to use this book to learn what are all the effects upon human beings produced by any one group of Arthropods must have recourse to the Index and this we have found incomplete. Thus, to the entries for "mosquitoes" should be added pages 186 and 291, to those for "ticks" pages 62, 221 and 230, mentioning only the lacking references to the first pages of sections or chapters concerned, without attempting to supply a reference to every page on which the word "mosquito" or "tick" happens to occur.

The title of the book naturally suggests that of another, recently published in English: Patton & Cragg's "Textbook of Medical Entomology," noticed in the NEWS for July, 1914, pages 333-334. In the latter volume the arrangement is entomological throughout, the various results due to the interaction of Arthropods and Man being discussed in connection with each taxonomic group.

Riley and Johannsen's Handbook is a much smaller book than that of their Anglo-Indian predecessors, as the American authors give no, or very brief, descriptions of the structure of the Arthropods with which they are concerned, assuming, no doubt, that those who will

use their book have already acquired such information. Patton and Cragg, on the contrary, give very full accounts of the anatomy and physiology.

The twelfth chapter of Riley and Johannsen consists of Keys to the Arthropods noxious to Man. There is an up-to-date bibliography of 14 pages arranged alphabetically under authors' names, and the 8 page index. P. P. C. (*Advertisement.*)

Doings of Societies.

English and German Entomological Societies and the War.

At its meeting of November 4, 1914, the Entomological Society of London adopted the "Reply to the Declaration of German Professors" in regard to the present war which was published in the London *Times* of October 21. The "Declaration" and the "Reply" are reproduced in full in the *Proceedings* of the Society for 1914, pp. xc.-xciv. Prof. Auguste Lameere, of Brussels, was elected on December 2, 1914, to the Honorary Fellowship vacant by the resignation and subsequent death of Dr. August Weismann.

The Deutsche Entomologische Gesellschaft of Berlin, at its meeting of September 7, 1914, unanimously adopted the following resolutions: 1. During the war only one official meeting will be held on the first Monday of each month, the others are not compulsory. 2. The Society assigns paper to the nominal value of 500 marks to the Red Cross and to the National Fund for the families of those fallen in the war. Herr Blume, Jr., member, was wounded at Ypres; Herren Ahlwarth and Speiser are in the field.

Chicago Entomological Club.

Meeting of January 17, 1915, at the home of Charles Selinger, eleven members attending.

Considering the likelihood that a number of entomological enthusiasts would stop over at Chicago on their way to the Panama Exposition, it was suggested that it would be desirable to serve such visitors to the best of our ability and enable them to meet those similarly interested. It was therefore decided to invite all prospective visitors to correspond with the secretary and advise him of their plans, so that suitable arrangements can be made. The secretary was further authorized to call upon the members of the club for any necessary assistance.

As an attraction entomologically, Chicago has the Strecker collection of Lepidoptera, which is at the Field Museum of Natural History, besides several large private collections of Lepidoptera and Coleoptera, one of Hemiptera and several general collections.

Lepidoptera.—Lepidopterists had as a subject the genus *Hadena*, which was informally discussed. Local captures in this genus

were reported as follows: *Hadena stipata* rare, *passer* not rare at light, *suffusca* 1 at light, *apamiformis* rare, *dubitans* common, *plutonia* several under logs, *devastatrix* common, *arctica* common, *cucullifórmis* rare, *verbascoides* rare, *cariosa* not common, *lignicolor* common, *mactata* rare, *modica* common, *miscelloides* 1 at sugar, *fractilinea* not rare, *semicana* not rare, *misera* rare, *jocasta* rare, *diversicolor* bred from *Carex* sp., *chlorostigma* rare.

Meeting of February 21st, at the home of J. H. Reading, fourteen members present.

Lepidoptera.—Mr. Reading has a large collection of both exotic and domestic Lepidoptera which proved very entertaining. Lepidopterists brought their specimens of the red underwing group of the *Catocalae* and particular attention was given to these. Local captures were reported as follows: *Catocala ultronia, coccinata, cerogama, ilia,* var. *uxor,* var. *osculata, marmorata, parta, unijuga, meskei, briseis, cara, amatrix,* var. *nurus, concumbens.*

Coleoptera.—Coleopterists had the Buprestidae as a subject and noted the following captures as being of special interest:

Dicerca asperata Lap. and Gory, at Edgebrook and Ft. Sheridan, on oak.
Dicerca caudata Lec., at Riverside, Illinois.
Poecilonota thureura Say, at Millers, Indiana, on poplar.
Buprestis obscura Casey, at Millers, Indiana, and Pine, Indiana, on pine.
Buprestis confluens Casey, at Millers, Indiana, on pine.
Buprestis striata Fab., at East Gary, on pine.
Agrilus crataegi Frost, at Edgebrook, on pine.
Agrilus crinicornis Horn, at Ft. Sheridan to Willow Springs.
Agrilus obliquus Lec., at Bowmanville.
Chrysobothris azurea Lec., at Edgebrook, on *Crataegus.*

A total of 55 species of Buprestidae have thus far been identified and reported from the Chicago area.

After the usual refreshments, always welcome to bugologists, the meeting adjourned.

ALEX. KWIAT, *Secretary,* 2055 Pensacola Ave., Chicago, Ill.

Feldman Collecting Social.

Meeting of February 17, 1915, at the home of H. W. Wenzel, 5614 Stewart St., Philadelphia. Thirteen members present, Pres. H. A. Wenzel in the chair.

Dr. Skinner mentioned several species of various orders in which 20 and 30 years intervened between captures; said he believed if one knew the habits of these insects they would easily be caught and no species would be rare.

Lepidoptera.—Mr. Haimbach exhibited a box of Heterocera containing the following species: *Phragmatobia fuliginosa* Linn., *Ec-*

pantheria deflorata, Fabr., *Halisidota caryae* Harr., *Apatela funeralis* Grote, *Metathorasa monetifera* Gn., *Hypsorophia hormos* Hübner, *Plusiodonta compressipalpis* Gn., *Tarache delecta* Walk., *Euthisanotia grata* Fabr., *Phiprosopus callitrichoides* Grote, *Achatodes zeae* Harr., *Remigia repanda* Fabr., *Lophodonta angulosa* S. & A., *Schizura badia* Pack., *Fentonia marthesia* Cram., *Ianassa lignicolor* Walk., *Tolype vellida* Stoll, *Tolype laricis* Fitch, *Datana perspicua* G. & R. and *Harpyia borealis* Bov. With the exception of *Tarache delecta* the specimens exhibited were all taken at upper Roxborough, Philadelphia, and all these and many other pretty species have been comparatively common on and about his place. The specimens of *Tarache delecta* he caught at Cape May Point, New Jersey, in the cat tail swamps on July 26, 1914. The speaker also reported the capture of one specimen of *Melipotis nigrescens* G. & R. on July 3, 1914, at Roxborough. He said he took a pair of this species in Fairmount Park, Philadelphia, about twenty years ago. (Texas and Calif.—Dyar's List.)

Coleoptera.—Mr. Kaeber exhibited a species of *Ptinus* which he had bred from English walnuts January 26, 1915, and a specimen of *Zenoa picea* Beauv. collected at Red Bank, New Jersey, July 4, 1908, which latter is not in the New Jersey List.

Adjourned to the annex.

GEO. M. GREENE, *Secretary*.

American Entomological Society.

Meeting of February 25, 1915. Dr. Calvert, President, in the chair; nine persons present, including Messrs. W. T. Davis and P. W. Whiting, visitors.

Mr. Davis stated that some celluloid or gelatine points on which insects had been mounted had been injured by acetic ether used to kill *Anthrenus*.

Odonata.— Mr. Davis exhibited a male of *Gomphus abbreviatus* Hagen, collected at Greenwood Lake, New Jersey, June 18, 1911, by F. M. Schott, and an addition to the dragonflies of New Jersey. Mr. Greene, while at Dreer's nurseries, Riverton, New Jersey, on the 14th inst., had visited the house where aquatic plants are grown and saw a number of dragonflies flying around. Dr. Calvert remarked that in the Bulletin of the Brooklyn Ent. Soc. VIII, pp. 93-96, Oct., 1913, Mr. W. T. Davis had established the genus *Williamsonia* for *Cordulia lintneri* Hagen. The recorded localities for this dragonfly are Center, near Albany, New York (types), Saskatchewan, Lake Winnepeg, and Paterson, New Jersey. The speaker now wished to record the occurrence of this species in Massachusetts, based on three specimens which he had examined during the past three years, viz., a female from Dedham, May 20, by Mr. C. W. Johnson (now in the collection of the Boston Society of Natural History) and a male and female from Concord, May 16, 1908, sent from the Thoreau Museum of the Middlesex School in Concord for identification. These latter two had been much

damaged in transit, and the female, now in the collection at the Academy of Natural Sciences of Philadelphia was exhibited.*

Orthoptera.—Mr. P. W. Whiting described experiments performed upon *Chortophaga viridifasciata.* This grasshopper, as is well known, occurs in two color phases, green and brown. The males are almost exclusively of the brown phase, green males being very scarce. Females occur in both phases quite commonly. Experiments were performed at the Bussey Institution of Harvard University by mating brown with brown and green with green, also by cross-matings. This produced all brown individuals irrespective of the parentage. The conditions under which the young were reared were hot and dry. Later the environmental conditions were tested, and it was found that dampness produced green individuals. In a few cases brown individuals were shifted to green after an ekdysis. Green individuals always shifted to brown when conditions were hot and dry. At the University of Pennsylvania the conditions have been better controlled by means of constant temperature rooms, and here it is found that coolness and dampness produce green individuals, while heat and aridity produce brown individuals. The lighter browns apparently are a step in the direction of the green since dark brown individuals become lighter before they turn green. The work of Dr. Nabours shows that pattern is hereditary. His experiments were performed upon *Paratettix texanus. Nomotettix* apparently has the same color patterns as *Paratettix texanus.* It is intended to investigate these shortly. Mr. Rehn said work in the field corroborated Mr. Whiting's experimental studies.

Lepidoptera.—Mr. Laurent exhibited a series of specimens of *Hyphantria cunea* (the fall web-worm moth) in which the maculation of no two specimens was alike. Specimen No. 1 was pure white without a spot, while in specimen 16, the maculations were so numerous that they gave the anterior wings a blackish appearance. In the majority of the moths the posterior wings were immaculate, only a few showing any maculations. The speaker stated that the caterpillars did not always remain in the first web, increasing the size of the web until the caterpillars became full grown, but that often part of them left the first web-like nest and spun a new one some distance from the old one. From one-fourth to one-half of the caterpillars often deserted the old web. Mr. Williams exhibited mounts of the genitalia of *Eumaeus atala.* He said he had found a retractile brush between the genitalia and the last abdominal segment. This brush is apparently made up of modified scales. It is a male secondary sexual character.

HENRY SKINNER, *Secretary.*

* This record has also been published by Mr. E. L. Pierson, Proceedings of the Thoreau Museum of Natural History, Middlesex School, Concord, Mass., Vol. I, p. 41, Feb. 28, 1915.—ED.

OBITUARY.

FERDINAND KOWARZ, born in Plan, Bohemia, February 23, 1838, died at Franzensbad, September 22, 1914. From 1859 to 1901 he was in the Austrian telegraphic and postal service. Dr. Th. Becker, who contributes an obituary sketch of him to the *Deutsche Entomologische Zeitschrift* for 1915, Heft I, accompanied by a list of his 19 papers on the Diptera between 1867 and 1893, considers that his services to Dipterology consist in the enlargement of our knowledge of genera and species of the European fauna, partly by new descriptions, partly by systematic studies, in which he made large use of chaetotaxy. He received his first impulse to the study of these insects from Schiner with whom, and later with H. Loew and Mik, he remained in lifelong friendly relations.

A biographical notice, in Swedish, of Dr. FILIP TRYBOM, accompanied by a portrait, is contained in the *Entomologisk Tidskrift* Arg. 35, Häft 1-2, Uppsala, 1914, recently received. Doctor Trybom was born December 24, 1850, and died February 15, 1913. A bibliography of 27 titles appended to the notice includes articles on Diptera, Odonata and Physapoda, on which last group most of his entomological work was done.

[From the *Deutsche Entomologische Zeitschrift* for 1914 Heft VI and 1915, Heft I, and *Entomologische Blätter*, XI, Heft 1-3, 1915, we learn of the deaths of the following entomologists in the war:]

Dr. WALTER STENDELL, born August 25, 1889, author of *Beiträge zur Kenntniss der Oenocyten von Ephestia kuehniella* Zeller, at Léchauld, September 28, 1914.

Dr. OTTO KIRCHHOFFER, born July 2, 1863, author of *Untersuchungen über die Augen pentamer Käfer* and of *Die Entwicklung der Complexaugen nebst Ganglion opticum bei Dermestes vulpinus.* [Date of death not given.]

Oberleutnant v. ROTHKIRCH UND PANTHEN, an active Coleopterist, was killed on the borders of Kamerun.

Dr. W. HAAS, assistant in the Institut für Binnenfischerei in Friedrichshagen.

Dr. F. VOGEL, worker in the Landesanstalt für Gewässerkunde in Berlin.

EXCHANGES.

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Diptera—Wanted for cash or to borrow for study only, North American Leptidae (incl. *Coenomyidae* and *Xylophagidae*).—M. D. Leonard, Cornell University, Ithaca, N. Y.

Costa Rica—Any one interested in entomological material from Costa Rica should communicate with me at once. I expect to spend three months there this summer.—D. E. Harrower, Swarthmore, Pa.

Wanted—50 *V. huntera*, 100 *H. unipuncta*, 25 *A. argillacea*, *Arg. diana* 2 pair, *L. eros*, *L. hulstii*, *M. eurydice* males only, *M. yuccae*, *T. gundlachianus*, *T. proterpia*, *T. nicippe*, *L. sononensis*, *T. chrysalus*, *L. ursula* 6 of each = 3 pair, 8 of any *Chrysophanus*.—A. F. Porter, Decorah, Iowa.

For Exchange—Catocala from this locality for *Catocala* and other Lepidoptera not in my collection; also fertile ova of *Catocala amatrix* and *nurus*.—Mrs. O. F. Hiser, Nevada, Iowa.

Specimens collected—Will collect Diptera, Hymenoptera, Ichneumonidae, Odonata, Hemiptera-Homoptera, Coleoptera or Lepidoptera during the coming season. Let me know your desiderata now.—Harry L. Johnson, So. Meriden, Ct.

I will name specimens of Coleoptera in certain families. Correspondence with beginners desired. No specimens will be retained without permission of the owner.—C. A. Frost, 26 Pond St., Framingham, Mass.

Wanted Transactions American Entomological Society, Vol. IV; Entomological News, Vol. II, Nos. 6 and 10, or Volume.—Howard L. Clark, Hotel Puritan, Commonwealth Ave., Boston, Mass.

I have a number of duplicates of entomological Exp. Station Bulletins, Entomologist's Reports, Bureau Bulletins and Circulars, etc., for exchange or sale.—Geo. G. Ainslie, 227 Peachtree St., Nashville, Tenn.

Will exchange eggs of *Hemileuca maia* for native or exotic Lepidoptera and Coleoptera and Cicindelidae. Send your lists.—Adolph Mares, 2524 So. Homan Ave., Chicago, Ill.

For Exchange—*Catocala tilania* Dodge for other species of same genus not in my collection. Send list and name terms to Ernst Schwarz, 6310 N. Newstead Ave., St. Louis, Mo.

Wanted—Six dozen cocoons *Cecropia*; 500 each Ova *luna* and *polyphemus*. Lowest price.—I Rushton, 10 Carlton Road, Worksop, Notts, England.

Siphonaptera wanted.—I desire to secure specimens of fleas from various parts of the world for determination. Host records important.—F. C. Bishopp, Box 208, Dallas, Texas.

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704.—**Weiss** (H. B.).—Additions to Insects of New Jersey. (Ent. News, **26**, 101-107, '15) ..... .15
705.—**Malloch** (J. R.).—A new species of Neogaurax (Chloropidae). (Ent. News, **26**, 108, '15) ..... .05
706.—**Ewing & Stover.**—New Parasitic Mites (Ent. News, **26**, 109-114, 1 pl., '15) ..... .20
707.—**Rehn & Hebard.**—Studies in American Tettigoniidae. IV. A Synopsis of the species of the genus Orchelimum. (**41**, 11-83, 4 pls., '15)..... 1.20
708.—**Alexander** (C. P.).—A second Bromeliad-inhabiting crane fly (Ent. News, **26**, 29-30, '15) ..... .05
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710.—**Banks** (N.).—A new genus of Canestriniidae. (Ent. News, **26**, 152-153, fig., '15)..... .05
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712.—**Nakahara** (W.).—Three new species of Japanese Orl Flies (Ent. News, **26**, 157-160, figs., '15) ..... .10
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